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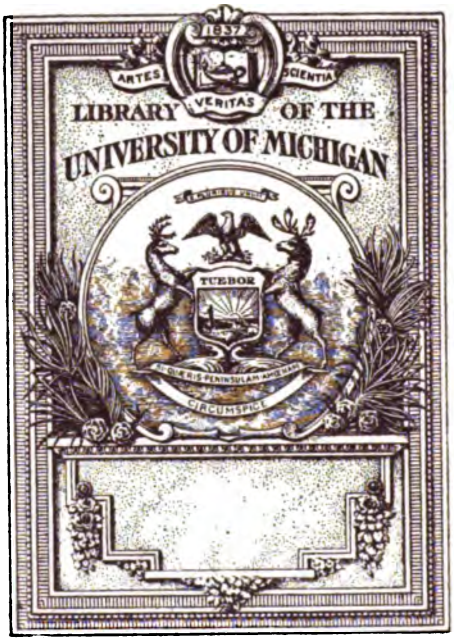

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VOLUME XX

JANUARY-OCTOBER, 1922

PUBLISHED QUARTERLY BY
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1922

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MOUNTAIN SCENERY—GREECE (See page 28)

By courtesy of Philadelphia Commercial Museum

THE RIO NEGRO, THE CASIQUIARE CANAL, AND THE UPPER ORINOCO, SEPTEMBER 1919—APRIL 1920.[1]

A. HAMILTON RICE, M.A., M.D.

(See map at end of magazine.)

The Rio Negro crosses the immense Brazilian state of Amazonas from north-west to south-east until it debouches in the Amazons, and is the largest tributary which comes in on the left or north bank of that great river. It rises in Colombia just east of the Papunaua branch of the Inirida and the cabeceras of the Isana, and is called the Guainia until its junction with the Casiquiare canal, when it becomes the Rio Negro.

Up to 1916 there had never been any serious or effectual attempt to map this great waterway with approximate accuracy, and one object of the present expedition was to correct and continue the Rio Negro work of the 1916-1917 expedition * * * (*Geog. Journ.*, 52, 205, October 1918).

The Casiquiare canal, which links the Orinoco and Amazon systems by a natural waterway, is the only example of its kind in the world. Its existence was rumored as early as 1639 by Padre Acuña, but was not confirmed until 1744, when the Jesuit Father Roman, while ascending the Orinoco from Carachama to visit the missions on the Guaviare, met some Portuguese slave traders under Francisco Xavier Morales from settlements on the Rio Negro, and accompanied them on their return by way of the Casiquiare. He afterwards retraced his route to the Orinoco, and seven months later La Condamine gave the French Academy an account of Father Roman's extraordinary voyage, as communicated to him by Father Juan Ferreyro, rector of the Jesuit College at Pará. It was further verified in 1755 by Iturriaga and Solano, chiefs of the Spanish boundary expedition.

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[1] Doctor Rice's article appeared in the November, 1921 issue of The Geographical Journal of London, and, for permission to reprint with the accompanying map, we acknowledge our indebtedness to the Editor of the Journal and to the Council of the Royal Geographical Society.—EDITORS.

The existence of the canal was denied by Padre Fritz, Gumilla, and Blaeu. It was believed by Sanson, and marked in the first maps of De L'Isle, but not on his later. La Condamine and D'Anville the geographer long believed the Orinoco a branch of the Caquetá, coming from the south-west, and that the Rio Negro issued immediately from the former. D'Anville in the revised or second edition of his map of South America marks the Rio Casiquiare for the first time, but made the Inirida connect the Caquetá and the Orinoco.

The Rio Negro throughout its length is water of thin quality and of mirror-black color, except over shoals in the sunlight, when it exhibits a translucent golden brown, while the exposed sandbanks and beaches are of the whitest and finest quality. On the Upper Orinoco, on the other hand, where the water is more turbid and light colored, the sandbanks and beaches are brown in color and coarse in quality. The transition shows plainly in the Casiquiare canal. As far as the mouth of the Rio Pasimoni, which is a black-water tributary of the Casiquiare, smooth, white, fine sand prevails, beyond which point the beaches and sandbanks become progressively darker and coarser, the water lighter and denser. For more than 200 miles from its Orinoco egress the banks of the Casiquiare, perpendicular and gnawed away, are further evidence of the lateral erosion of a sediment-bearing stream.

The integrity of the canal as a connection between two rivers of separate systems, without its capture by one of them, may be likened to any material system in a state of neutral equilibrium, a condition where as much work is resisted as is performed by the applied and internal forces. The angle of slope is gradual and slight from the Orinoco to the Negro. At its mouth in the Rio Negro the water-level is 212 feet above sea; at its beginning in the Orinoco 283 feet.

The level of erosion has been almost reached; the hard granite bed of the canal is nearly level with the eroded bed of the Rio Negro, and erosion by the thin, clear black water near the Negro terminal of the canal is weak; the more turbid water of its upper two-thirds expends its energy in excavation and construction on the steep concave banks and opposite low shelving shores of the tortuous stream.

The purpose of my last expedition was mainly topographical, and three principal objects were: to complete the mapping of the

Rio Negro; to survey and map the Casiquiare canal; and to explore and map the Upper Orinoco from its canal bifurcation to its headwaters.

A launch 45 feet in length, *Eleanor* II., with beam of 14 feet and draught of 2 feet, specially designed to overcome the difficulties of bad rapids, strong currents, submerged rocks, and shallow waters of the upper Rio Negro, was laid down January 1919 and completed in May. It was equipped with a 4-cylinder Metz kerosene engine and shipped to Manáos in June; the parts were assembled there and the craft ready late in August. The river steamer *Parahyba* was chartered to convey the party, equipment, and stores, and to haul the launch to Santa Izabel, 425 miles up river, the ancient settlement at the end of steamer navigation.

The expedition left Manáos on September 16, taking astronomical observations at places missed on the 1917 journey, and carefully revising the map.

We reached Santa Izabel on September 23, where Senhor Annibal Peixotto put his dwelling and storehouse at our disposal and tendered us every hospitality and kindness in his power. On October 9 we left Santa Izabel, and late on October 11 reached Umarituba, the estancia and store of Antonio Castanheiro Fontes. The proprietor, who on more than one occasion has proved our friend, was sorely ill, with many members of the large household. To render medical and surgical treatment, as well as to await the remainder of the supplies, delayed us until the 16th, when in company with the Fontes launch *Isabel* we reached on that evening the island of Pirinicui, in the lower part of the long series of rapids that stretch from the mouth of the Caiari-Uaupés to Camanáos. With difficulty both launches passed the strong Surubim and Camanáos caxoeiras, the Fontes launch being compelled to unload much cargo after repeated failures to get through.

Next day both launches proceeded up stream, passing the various rapids uneventfully until just below that of El Forno, when the *Isabel* ran on a rock, but was floated again after two hours' hard work. Both launches reached São Gabriel at sunset. The port is some distance below the town at the bottom of the bad caxoeira Curucuhy, in a cove of quiet water margined by a great beach of white sand, flanked by a forest of caá-tinga, whose drapery of mimosa and jasmine had a color and fragrance of tropical luxuriance. Caá-tinga in Lingoa-Geral signifies White Forest; generally low and less dense than virgin or high varzea forests, hence admitting more light.

The Salesiano Fathers of the São Gabriel mission, Monseigneur Lourenço Giordano and Father Balzola, with the Spanish schoolmaster, twenty-four pupils, and the lay brothers, came down to welcome us. The change in the dress, manners, and general appearance of the village children, due to the influence and instruction received in the school that my wife and I were instrumental in getting started three years ago, were satisfying. São Gabriel to-day, with its clean, nicely dressed, courteous schoolchildren, neatly fenced gardens, cleared spaces, and atmosphere of order and industry, is in striking contrast to the squalid village of naked little savages, neglected-purlieus, and lack of municipal control and mission influence that prevailed up to three years ago.

The navigation and pilotage of such a river as the Negro calls for a combination of local knowledge, experience, memory, nicety of judgment, quickness of eye and coolness of action such as is possessed by few. The channel is at all other times than high water (April to September) very irregular, crooked and broken, and the bottle-neck constrictions alternating with the lake-like expanses, in some cases veritable archipelagoes, are in marked contrast to the monotonous similarity of the interminable swings, bends, ox-bows, and horseshoe turns of the average alluvium-plain river such as the Solimoes or Purús.

In the latter type the channel is easily traced as it crosses from just below the gently shelving sand-beach of the convex shore obliquely to the steep, cutaway, concave bank opposite; but a river such as the Negro, whose bed is rock, shingle, or gravel, with deep holes, dykes, shelves, reefs, and bosses, requires an everlasting vigilance on the part of the pilot and helmsman. In black-water, rock-strewn rivers such as the Upper Rio Negro, sand means deep water; but in a white-water, sediment bearing stream where lateral erosion is marked, sand signifies shallows.

Rocks submerged just beneath the surface and the crests of reefs are indicated in the case of the thin black water of the Negro by a surface tremor known as "agua tremida." With bright sunlight ahead or when the water is stirred by a gentle breeze, the recognition of agua tremida is doubly difficult.

The two launches left São Gabriel on October 20, picking a precarious way up the passage of the rapids from Fortaleza to the Serras Caranquejo just below the mouth of the Caiari-Uaupés. These hills loom up prominently to the west from São Gabriel, and, like many other physical features of that region, are constantly undergoing a confusing change of name.[2] In Spruce's time they were called Serra da Gama; previous to that, Urucú-iuitéra;[3] up to a few years ago they were termed Serra Cauaburi; now they are called Caranquejo.

São Fellipe just below the mouth of the Isana was reached on October 21, São Marcellino at the mouth of the Xié on the 22nd, and Cucuhy, the military frontier post of Brazil on the high left bank of the river, on the 23rd. For two hours or more before the post is reached, the great granite boss of Cucuhy stands out steep and sharp against the horizon, a gigantic natural boundary-pillar.

From São Fellipe to São Marcellino the river is very picturesque, with great reaches and many islands, which terminate in long, smooth, sloping rock points, the favored sites for habitations. The forest appears higher than it does lower down, and presents every shade of green. The banks without rock are steep and clean, or protected by a dense matting of beard-covered roots and vines. Huge bushes of jasmine were in flower, and many trees with blossoms resembling laburnum stood out vividly against the masses of tropical greenery. The sitios or habitations appeared cleaner, the clearings larger and more prolific, than on the lower river.

São Marcellino is an old settlement on the right bank of the Xié, and has to-day a little white chapel and five houses all in good repair. The place is noted for the excellence of its farinha (mandioca). There were several families of Indians in residence (Barés) of good type.

A base was established at Cucuhy, from which to send forward cargo by batelão to San Carlos, the next base, and to receive the remainder of supplies and equipment from São Gabriel and Umarituba. Cucuhy has one house with kitchen and two adobe huts as quarters for the N.C.O. and ten soldiers who form the garrison.

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[2] *Vide* 'Notes of a Botanist on the Amazon and Andes,' chap. xiv. vol i. Letter to Mr. Bentham.

[3] Tupi-Guarani for hills or serras of urucú, a black dye obtained from a bush.

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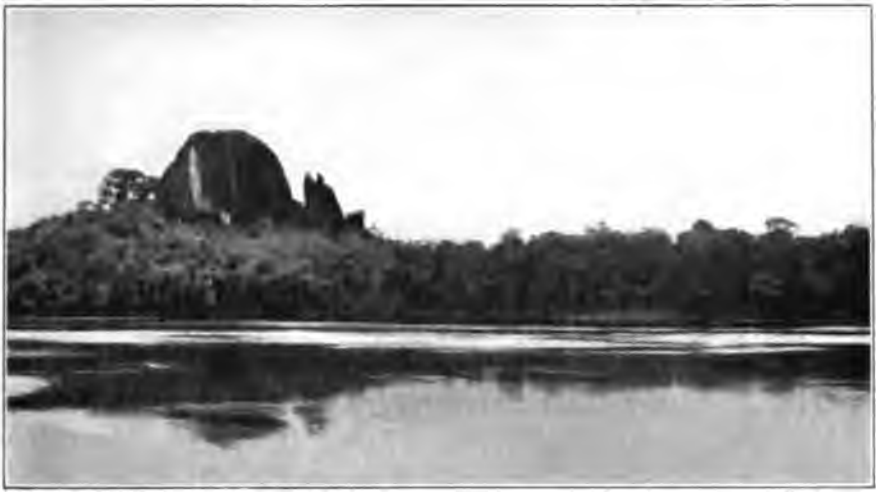
When we entered the canal the water was low, 6 feet under the mark of the previous year, the short rise that usually follows the November fall had not occurred, and it was necessary to proceed slowly and with utmost caution.

We started through the canal with the launch on the morning of December 13, reaching the mouth an hour and a half after leaving San Carlos and passing of the raudal Mabajota, the Uinumane of Humboldt. The day was spent in gauging the depths of the Guainia and Casiquiare, measuring the widths, and an attempt to obtain time signals from Darien with the wireless, which however was precluded by an inopportune thunderstorm. The width of the Rio Negro is 2332 feet, of the mouth of Casiquiare 2150 feet, and of the Guainia 1558 feet.

The night was passed just inside the canal at Chapazon, marked by small rapids, where both wireless signals and sights sufficient for a good "Marcq St. Hilaire" were obtained. The following day the launch was worked up slowly to Solano, striking once just below Congrejo Island. Solano is the oldest settlement on the canal, coming into existence at the time of the Scientific Expedition of the Boundary Commission of 1756, of which Iturriaga and Solano were the chiefs. On many of the old maps, military posts or settlements founded by military authority such as Solano figure as "pueblos," those of the monks as "reducciones apostolicas," signifying apostolic conquests or conversions.

At the time Humboldt visited Solano there were settled in that place two tribes of Indians, Pacimonales and Cheruvichahenas, the latter descendants of the Baniva nation, who are Aruaks, as are the Barés, who make up the present-day population of Solano—some two hundred men, women, and children, when they are all in town. At Solano, to Humboldt's insistent inquiries, through an interpreter, as to the sources of the Guainia, the Indians persistently replied that the sources of the Guainia and Inirida were as near to each other as "two fingers of the hand." Humboldt considered that his interpreter was unable to make them comprehend his question, but the results of my expedition of 1911-1913 proved that the Indians not only understood but answered correctly (see "Further Explorations in the North-Western Amazons Valley," *Geog. Journ.*, August 1914).

Next day Buena Vista, an ancient settlement, was reached an



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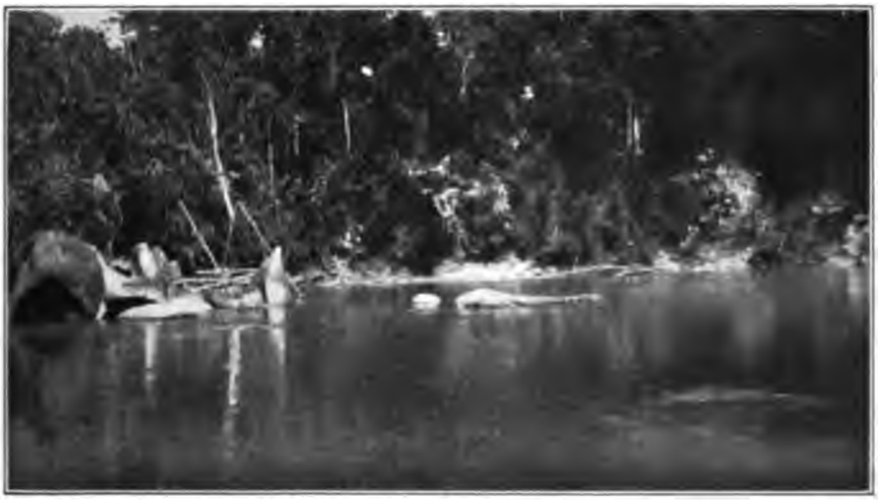
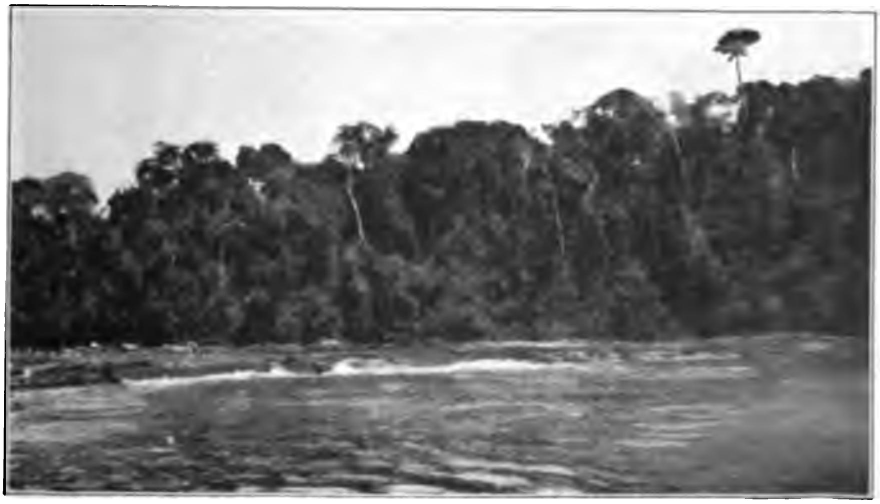
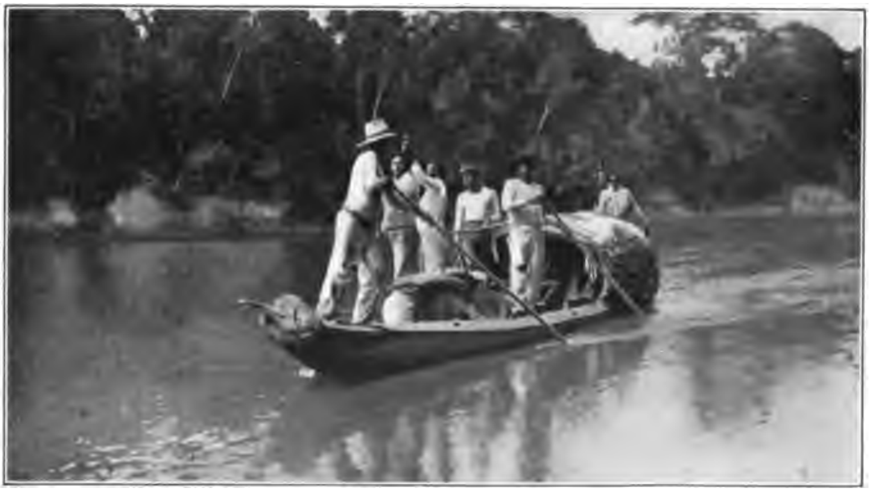


THE GUAHARIBOS BRIDGE, A FEW MILES BELOW THE RAUDAL

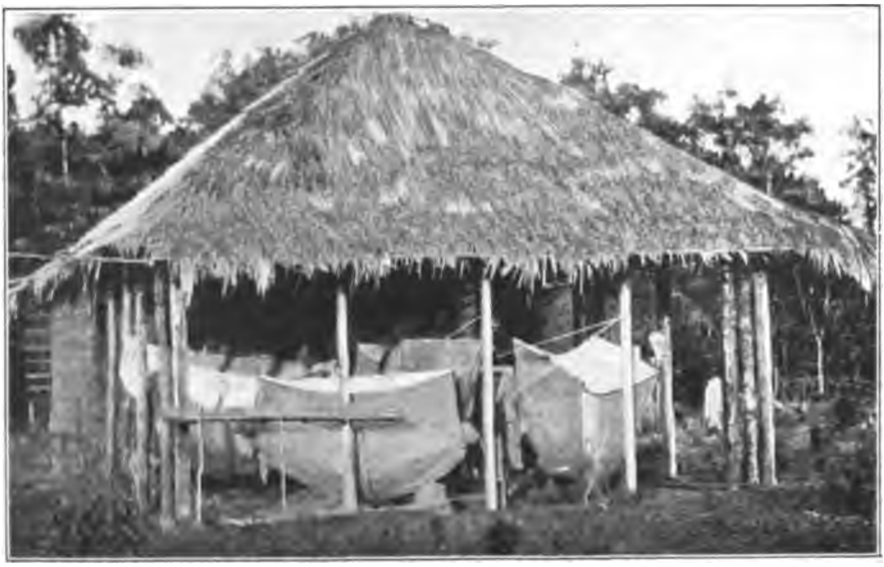


THE RAUDAL DE LOS GUAHARIBOS

THE PIEDRA DE MAPAYA, UPPER ORINOCO



A FALCA PROPELLED WITH PALANCAS



MOSQUITO-NET HAMMOCKS FOR ALL THE PARTY ON THE UPPER ORINOCO hour and a half before noon. Humboldt does not mention the place; but Spruce stopped there, and it had the same number of houses in 1853 as exist to-day, some six; a dilapidated shed and unoccupied huts mark the old site.

Fifteen miles above Buena Vista the Rio Pasimoni (black water) discharges into the Casiquiare flowing from the east. The headwaters of the Cauaburi are easily reached by the south or Baria branch of the Pasimoni by a short portage, or entirely by water, the Mariquiene branch of the Baria being connected with the caño Marije of the Cauaburi by a natural canal, the Maturáca.

Four miles above the mouth of the Pasimoni is El Mango, the old Santa Cruz of Spruce. It occupies, after Capibara, the most picturesque site in the canal, and has to-day a house, several huts, and a couple of fumadores, the chief station of the Casiquiare seringal of Fuentes. The house is shaded by orange and great mango trees, and there are superb vistas up and down the stream, both banks of which are heavily forested with lofty trees. Points of rock (lajas) jut into the canal at many points, often striking at each other from opposite banks, forming narrows with fords above and below, scoured by the eddies due to the narrows.

The ancient pueblo Quiarbuena mentioned by Humboldt and Spruce no longer exists, nor is there any indication of its former site on the left bank, which is strewn with great blocks of rock.

The Rio Siapa, which enters the Casiquiare on the left bank, has white water, and the mouth appears smaller than that of the Pasimoni, but it is a longer, larger river than the latter.

Three miles above occurs the raudal Cabarua at an angle where the canal is much narrower. The only channel possible for the launch was hard against the right bank, a narrow lane of swift-running water, whose constricted rock walls barely allowed passage to our 14-feet beam. At the top the large flat rock rampart of the right bank is adorned with Indian picture-writing.

Just within sight of Curare, a rubber station of Fuentes, the launch at full speed struck a sunken rock, shaking her from stem to stern. With some difficulty the launch was backed off and headed into Curare, where, with the aid of ten Indians, rollers, and cables attached to the boles of breadfruit trees, she was pulled out on a sloping rock sufficient to allow examination, which disclosed the rabbit broken, the planking of the port bow splintered, and some seams sprung—damage slight in comparison with the shock, and gratifying evidence of the stoutness of the hull. The necessary repairs were effected by next morning, and the launch jacked back into the stream.

A perceptible change in the banks is noticeable above Curare, where the canal takes on the marginal appearance of a white water-river. There are great quantities of jauary palms rising behind the bushes of the bank, and the macanilla palm (paxiuba-miri) now appears in numbers associated with the assahy.

Nine miles above Curare is the Paso el Diablo (Devil's passage), a bad correntada. Before the caño Mamoni is reached, which comes in on the right and from which it is possible to reach the Guainia by the caño Teriqui, huge blocks of rock stand out of the river, some surmounted with trees, and a short distance within the forest on the left bank the brow of a great black rock, the cerro de Canumata, is discernible just above the treetops.

From Curu-curú to the mouth of Lake Pasiba (the so-called Lago de Paçiba) is some 15.39 miles. The canal is narrow and winding, the steep banks littered with the boles and limbs of fallen and half-submerged trees. The forest is for the most part high, a dense curtain of foliage, vines, streamers, and lianas draping and festooning the river's edge.

The water from Lago de Paçiba was black, but immediately loses its characteristic hue upon entering the Casiquiare, and above the mouth the canal became so shallow as to compel very slow and cautious navigation.

Both banks are marked by individual lofty trees which loom far above the forest and display an enormous spread of limbs, conspicuous among which are cachicamas, sassafras, and ceíbas. The forest on its river front is trellised and rigged with vines, lianas and sipos forming an impenetrable mesh, its dense continuity carried to the water's very edge, when the banks allow, by *Ingas* and *Convolvuli*. Where the continuity of the high forest is broken owing to low rebalsa, the yagrumo, a *Cecropia,* succeeds, but these intervening spaces while frequent are never extensive.

Opposite the mouth of the Lago de Pasiba is the mouth of the caño Caterico, black water, marked by many trees of narrow leaf and cedar-like appearance, locally called arepita (*A. xylopia*). They are quite numerous on the upper Casiquiare.

[illegible]

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[illegible] and sandy. [illegible] a large portion of the [illegible] covered with a barren white sand. [illegible] soil rather than to the amount of light language who now stoutly denied their knowledge, and to make doubly sure that there should be no impressment of their services, they embarked long before sunrise the following morning, seeking safe asylum elsewhere.

The leading Maquiritares were especially interested in the illustrations of Chaffanjon's book: Aramare, their famous chief of a generation or more ago, a Maquiritare house, and a seringuero's fumadero. These made a profound impression, for throughout the afternoon other Maquiritares were continually appearing at the door to ask a peep at the woodcuts.

The Maquiritare nation occupies a large region of the Upper Orinoco, from just above the great cataract of the Maipures on the west to the Rio Padamo on the east. Koch-Grünberg found them near the sources of the rivers Merevari and the Uraricuéra.[6] There is a large village of them, called San Remo, in the valley between Duida and Marauaca, near the source of the Padamo, which may be reached overland in from a day and a half to two days from Esmeralda. The Barés who have visited there tell of many women, children, and dogs. Spruce has left a memorable account of them from knowledge gained when, at the invitation of their chief Ramon Tussari, he visited their settlement in the Rio Cunu-cunúma. Amarare was their last great chief, and his ceremonial visits to San Carlos in Baré country were spectacular, the old chieftain travelling in a very long war canoe manned by thirty lusty paddlers and accompanied by a flotilla of smaller craft. Fuentes well remembers the sight, and that the drumming never ceased during four nights and four days.

The Maquiritares who inhabit the country around the headwaters of the Cunu-cunúma and Padamo are reputed to traffic with the Guaharibos, meeting them once a year or so, when the Maquiritares exchange their old, worn-out iron and steel instruments for hammock thread and small balls of baked clay with which they vary their usual not very extensive dietary. At the present time there is estrangement between the Padamo Maquiritares and the trafficking portion of the Guaharibos, due to marauding and murder of the former by the latter.

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[6] "Meine Reise durch Nord-Brasilien zum Orinoco 1911-1913," von Prof. W. Th. Koch-Grünberg. Freiburg i. B., Sonderabd. a. d. Zeitschr. Ges. für Erdkunde, Berlin, 1913.

Six miles above Pato, coming in on the right, is the Caño Desecho (the Itiniuini of Spruce). It rises in a great morichale (as also the Caño Caterico), and a caño known as San Miguel flows from it to the Guainia, so that it is possible to pass to or from the Casiquiare and Guainia. Itiniuini is said to be the old Baniva name applied to both San Miguel and Desecho caños, which were considered one and the same.

Capibara is accounted the most picturesque spot of the canal. It had been abandoned in Spruce's time, but was noted for Indian picture-writing, and many of the originals of Spruce's drawings are to be found here. The rocks are half a mile back from the river in some low woods (caá-tinga), and considerable scraping and cleaning of the surface had to be done before the figures were legible. It is also at Capibara that the riven rock stands in the river as sketched by Spruce.

The present proprietor has a good house, surrounded with flowering shrubs and bushes, a handworked cane mill, extensive clearings with sugar-cane, corn, and yuca under cultivation, forty Indians (picadores) engaged in clearing and agriculture and others working rubber, the latex of which is cured in the several fumadores as fast as it is brought in.

Just above Capibara the big caño Macasi comes in on the left bank. Its headwaters are very close to those of the Rio Pamoni, which debouches into the Casiquiare higher up, and hostile Indians are said to dwell about their sources. As we left Capibara the morning of December 27, hordes of white-winged insects were seen travelling up stream. The Indians say that when these clouds of insects are working up stream it is a sign the waters are rising, and when they are descending falling water will follow.

The laja Carosa extends more than two-thirds across the canal from the west or right bank, forming a raudalito at low water. There is much Indian picture-writing on the great flat rocks, and several huts of seringueros perched on the forested bank.

For 2 miles above the island of Perariama, a mass of rocks and trees, the whole way is strewn with rocks. At the foot of this raudal, known in Spruce's time as Camaciáno, was the pueblo founded by Monagas on the left bank. To-day neither pueblo nor name exists where Spruce interviewed Kudé-Kubúi, the so-called Guaharibo captured thirty years before by Monagas. It was more likely he was a Makú, as his description corresponds to the type encountered on the Rio Negro, Caiari-Uaupés, Isana, and their tributaries, a race despised by the more advanced nations of Carib, Aruak, and Betoya stocks. The Makús, as Koch-Grünberg says, are scattered over an immense area, and represent a race of indigenes far antedating the other three.

Filomeno Padron, my pilot of the Upper Orinoco, described to me three classes of Guaharibos: a tall, large race that live around the Guanaya cerros; another small race that has no contact with any other tribe, and inhabits the small streams making up the cabeceras of the Orinoco; and a third class termed Chingos by the Maquiritares, on account of their straight, flat Mongoloid-like noses. It may be that these are different tribes, such as the fierce Karishanas and Pianoghottos, who are mentioned by Schomburgk and Brett in the region ordinarily ascribed to the Guaharibos.

At Buenos Aires is the house of Colonel Emiliano Franco, a Venezuelan who to-day single-handed is trying to reclaim and colonize Esmeralda and utilize its natural advantage for cattle raising. Esmeralda to-day has but a single house. In Spruce's time the site of the Spanish "reduccion apostolico" of Humboldt had been changed, as is evident from Schomburgk's sketch in 1838, and the site of the village as Spruce knew it remained until after Chaffanjon's time. The present house, belonging to Colonel Franco, is near the old cemetery of the first village, and under the hill on which the great cross stood until a few years ago.

Between Buenos Aires and the Orinoco, which was reached on December 30, the canal becomes very narrow. The banks are perpendicular, high, clayey, and typical of a white-water, sediment-bearing stream. There is one good-sized caño, the Caripo, black water, which comes in on the left, opposite to which there are some rocks with Indian picture-writing, much of which however has been deleted owing to extensive shaling.

The Orinoco at the bifurcation is 1000 feet wide and the canal 758 feet, but this almost immediately narrows to 150 feet. The canal leaves the Orinoco, whose course is 270°, at an agle of 30° on bearing 240°, but bends sharply to a bearing of 133°.

Humboldt's estimate of the length of the canal was 180 miles, and that of Michelena y Rójas 300 miles. The actual running time of the launch from the Guainia to the Orinoco was 39 h. 19 m. This was against a current which the current log gave in different parts of the canal as 0.85 knot (0.98 statute mile). The actual running time from the Orinoco to the Guainia was 26 h. 4 m. The current rate and depth of water in the canal were approximately the same in early February 1920 as in December 1919. The distance logged against the current was 272.14 miles (statute), the distance with the current 182.25 statute miles, giving a mean of 227.19.

On measured trials the speed of the launch was 7 m.p.h. In still water on the Negro the launch logged consistently 7.2 to 7.4 miles. The average rate in the canal by the log works out at 5.8 statute miles against the current, and 8.7 miles with it. The Guainia mouth of the canal is 212 feet above sea-level, and that of its Orinoco origin 281 feet. Thus the canal has an average slope of 0.6 foot (7.2 inches) per mile, or one-third of the Thames.

A short distance above the bifurcation the Orinoco is narrowed into a constricted rocky passage through one of a group of low hogbacks on the north side of the river called Tama-Tama, which crosses the river meridionally, disappearing on the south side beneath the more gradually sloping ground. Above Tama-Tama the river spreads out to a great width with many banks, among which it was not always easy to find a channel.

When the great cumulus clouds that seem for ever to be floating below the summit of Duida are lifted, the impressive massif is revealed in all its grandeur. From the south it appears wedge-shape, with escarpment facing east-south-east and long dip-slope inclining west-north-west. Along its side four abrupt ridges separate divisional rents, where in the high lights bare seams are disclosed; elsewhere the mountain is forest-clad to its very top. The sharp ridges, steep arêtes, and broken cliffs of the flanks are in marked contrast with the flat, rounded curves of the summit.

We started up the Orinoco from Esmeralda in the afternoon of 11 January 1920 to carry the survey to the raudal de los Guaharibos, and beyond if possible. The party consisted of seven Indians, the younger Fuentes who had accompanied us from San Carlos, Ober, and myself. Two canoes were employed; a falca with a palm thatch cabin, a craft 30 feet long, holding not uncomfortably seven persons, instruments, stores, and equipment; the other a curiara, much smaller, used by the two men who acted as hunters and fishermen. The river was shallow, and palancas were used in place of paddles.

These are poles 10 to 12 feet in length, used in poling and pushing, to the ends of which are lashed Y-shaped pieces of wood useful as tenons against the exposed roots of the torn banks and the limbs of fallen and partially submerged trees.

The river was filled with great playas, upon which apparently inexhaustible supplies of turtle eggs, of both the tartaruga and tericay, were laid and lightly buried. The plague of insects was intolerable: piums that usually get to work shortly after sunrise, and do not desist until after sundown, make existence almost unbearable ashore, but the torture is considerably lessened afloat, even a few feet from the banks.

Early in the morning of January 13 we passed the mouth of a desecho[7] on the left bank that is said to encircle the hill or cerro Tigre to the south of us, and a desecho on the right bank coming from the Padamo.

The banks for the most part thus far were of the concave and convex or barranca and playa type, with not much rock. Where low on both sides, with vegetation to the water's edge, there was much parkia, and the crowning glory of the vegetation was a marupa (*Simaruba amara*), whose entire rounded top was a mass of violet. Some rocks in the shade of the left bank just above Chiqüire island were schists tilted at every angle and traversed by dykes and veins of quartz.

The Rio Padamo comes in on the right with water darker than the Orinoco, but is not a black-water river. Just above the mouth of the Padamo, on the right bank, the macanilla palm (*Iriartea exorhiza*) was seen for the first time since leaving the Casiquiare, where it flourishes with the assahy. It was here in close association with the magnificent jagua, which is the noblest and greatest of the Orinoco palms, eulogized by Humboldt and Spruce. Spruce says the jagua is an unclassified *Maximiliana.* I can find no mention of it in Barbosa Rodrigues' great work on Palms, nor in Martius' superb volume, nor does Wallace give it in his admirable little book.

San Remo is the settlement of the Maquiritares at the head of the Rio Padamo, and is reached by the caño Uñimapo, an affluent of the Padamo. San Remo is one to two days overland from Esmeralda, between Duida and Marauaca.

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[7] Desecho is the term applied to any body of water which leaves the parent stream and joins it again further down ; or it may be an offshoot of a tributary stream near its mouth linking up the affluent with the main river, known to the Brazilians as "furo," and called "brazuelo" by the Colombians.

The Rio Ocamo, which comes in on the right bank, has white water, and the mouth is narrower than that of the Padamo. The Ocamo rises in some big cerros called Cuare, reputed to be rich in cacao and vanilla. There are no Indians dwelling near its headwaters, nor along its course. At the laja Guaharibos, a great rock emerging from beneath a high perpendicular bank on the right shore, the river is narrow, the scenery wild and picturesque, and in dry weather it is a good place for a camp, as next to the hard sand of a playa for sleeping, the Indians prefer the rigid bed of gently sloping rock.

There are many monkeys in this country. Every day we saw bands of marimundos, capuchins, and ti-tis travelling up stream by lofty routes.

From the laja Guaharibos upward the river is narrow, with many vueltos and sharp turns, high concave and low densely overgrown convex banks. Jagua palms are still everywhere, lofty ceibas, and an occasional juvia (*Bertholletia excelsa*).

The Piedra Mapaya, on the right bank, is a great egg-shaped stone, small end uppermost, about 20 feet high, which marks a rocky point. It derives its name from the infinite number of small veins of quartz running over its surface, giving it the appearance of a map. It is mentioned by Humboldt, who never saw it but obtained a small piece of it from an Indian, and by Chaffanjon. Humboldt carried his piece of rock to Europe, and deposited it in the Berlin Museum. The Mapaya stone is surrounded by much broken rock worn into close-set sharp edges and criss-crossed in every direction by dyes and veins. There has apparently been extensive scaling of Mapaya; the surface layers in their present condition resemble an onion.

Our crew were all a cheerful, willing, good-natured lot, who toiled ceaselessly and uncomplainingly hours at a time pushing up the heavy, badly leaking falca against the strong current under a scorching tropical sun. At times the insects made it a hell of torture; at others heavy rains caused most irritating and vexatious discomforts; but the harder the trials the louder they laughed. Nor did I remember that either Luis or Simon ever forgot on embarking from camp or resting-place to utter the invocation, " Vaya con Dios, patron ! " their augury for a successful voyage.

The left bank of the river in this stretch has a dense selvage of parkia, behind which arose giant ceibas, box-like tamarisk, arepitos resembling cedars, great feather-like, quill-shaped cunauaros and jobos, lofty trees with big spreads of drooping leaflets and clusters of white blossoms. The river is narrow, tortuous, the turns very sharp, and wherever the igapó shifts to the opposite side so does the parkia.

All along the river in the barranca were great holes with well-beaten runways leading down to them which the Indians term " buracos," the licks of the tapirs that find the water-soaked, clayey earth to their liking or necessary to their otherwise herbivorous diet. This habit of the tapirs is on the authority of my men only.

The numerous tapirs we encountered on the way up and down were much more shy and wary than those on the extreme upper Inirida in 1913, which seemed not even astonished and seldom made off; the behavior of the tapir on the Upper Orinoco indicates that there are Indians about who hunt him down.

On Sunday, January 18, the river was very shallow, with great boulders in the bed. We were startled by a loud report on the right bank similar in sound to the discharge of a heavy rifle. Such an occurrence is mentioned by Spruce, who was a long time in ascertaining its cause: the collapse and shattering of great palms that have become old, decayed, and rotten (see ' Notes of a Botanist on the Amazon and Andes,' vol. 1, p. 423; and vol. 2, p. 438). Of the various sounds that at intervals break the silence of the vast solitudes, none is more striking than this. A big anaconda was dispatched with a shot in the head from the .405 Winchester rifle. He measured 15 feet 4.5 inches, with a girth of 2 feet 4 inches.

Late in the afternoon, poling up close along the high left bank, the men commenced to sniff and whisper " puerco." Both canoes were turned into the shore and a party quietly landed. The ground was everywhere traversed by trails of the peccaries, whose momentary rushes, angry grunts, and excited squeals were plainly audible. It was a big herd, and care had to be exercised in shooting them; for of all land animals in South America the most dangerous to hunt on the ground is the wild pig. On the offensive in rushing they stop at nothing until dropped by a bullet, and even when badly wounded will continue to fight viciously and furiously.[8] A man's only chance when attacked by several is to climb a tree, for the terrible teeth of those not slain would slash and tear him to ribbons. When a herd apparently scatters, a concerted flank movement on their part must be guarded against, and the game in the thick, dark, desolate forest is invariably attended with excitement and risk. A fine big boar was shot by Fuentes, but oncoming night compelled us to desist, and though the pigs twice again came close to the bank, no further stop was made until the up-river playa of a small island was reached suitable for camp, upon which a pacera[9] was erected for smoking the pig and fish.

Just after departure early next morning, piassaba palms, which had not been seen since leaving the Casiquiare, were a conspicuous feature of the low vegetation growing upon the very high left bank, while on the right bank was visible occasionally the western end of the Manaviche hog-back, whose axis is parallel with the river and is some 7 miles long.

A big bull tapir swimming across the river some 300 yards above was hit just behind the right ear on the first shot and did not sink before we came up with him. Towed ashore it required some seven men to pull the heavy carcase up the bank to a position where it could be cut up and dressed.

Much cacao was seen growing along the left bank, also many monkeys and peccaries. The country abounded in game, valuable timbers, nuts, cacao, and vanilla. One day we saw a large powerful hawk flying near the river surface, carrying a snake a metre long and thick as a wrist. Like a flash a caribe[10] rose, seized the snake, and pulled it from the hawk's talons.

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[8] In February 1920 Pedro Fuentes and his seringueros at El Mango killed 130 wild pigs as a great herd of them was crossing the Casiquiare canal. At such a time they are killed not only with rifles and shot-guns, but with clubs, spears, and arrows. Though strong swimmers they are at great disadvantage when caught in the water in any numbers, and easily dispatched by the Indians. At Cucuhy in November 1919 two of the soldiers killed five in the river by clubbing them, and a native hunter, single handed, with a stave accounted for four that were swimming across.

[9] A rack made by driving three poles into the ground so as to form a triangle. These uprights are notched and hold the frame, upon which sticks are laid crosswise to form a platform about 2 feet above a slow-burning fire which smokes the meat or fish.

The Guanayo cerros have contorted and buckled steep sides, forming swelling buttresses and deep cleft ravines. The smooth, undulating summits are wooded and in striking contrast to the wild and rugged aspect of the cliffs and flanks. Much of the exposed rock is pinkish in color. The slopes on which any vegetation exists are covered with low stunted growths, though in the ravines the woodland appears denser and higher. The eastern end of the westernmost cerro of the Guanayo group terminates in a great bastion rising abruptly from the river 1000 feet and more, at the base of which is a chorera or raudal that took 10 minutes' hard work to pass.

Old Pedro Caripoco said when he came by here with Chaffanjon the river was much higher, a rock on which we camped being entirely submerged at that time.

On January 21 the ascent of the river continued with difficulty, on account of the many rocks with which the bed was strewn, the innumerable chorros and correntados, and the treacherous hold the river bottom afforded the palancas. It was necessary to use the cable, attaching it around some boulder above, and warping the falca up espia fashion.

Three hours after leaving camp we found what remained of a bridge crossing from the right bank to a rock in the river, then obliquely to a larger island, and thence to the left bank. The bridge was a primitive affair of pier and truss, the piers being poles set X fashion bound together with strong vine,[11] thus forming a cradle for carrying the superstructure of poles of 10 or 12 feet for the footway lashed to the substructure ; a light handrail is whipped to the upper extremities of the piers. Much of the bridge of the right bank was down, floating on the surface, and the portion from the larger island to the left bank had been carried away entirely during the floods.

That day we reached the raudal Guaharibos. What looked to be the remains of two bridges, much smaller than the one below, were opposite an island which lies at the foot of the raudal. The opposite left bank is very high, steep, and concave, scoured by the eddy of the raudal, much of it covered with overhanging vines, and the base timber-strewn with great boles and booms of fallen trees.. The island is narrow, tree covered, fringed with rock and sand, and its upper end separated from the right bank by a narrow waterway not over 2 feet deep.

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[10] Identical with the Brazilian piranha, a small but ferocious and bloodthirsty fish, much feared by the natives and with good reason.

[11] Strong sipo of the Upper Orinoco known as Guaharibo bejuco.

During the day Pedro pointed out to me where Chaffanjon and his party passed up along the left bank; the old fellow also brought me a piece of twig that looked recently cut, significant of Guaharibos.

On the morning of January 22, Pedro and Filomeno embarked in the curiara to go down river a short distance to cut some macanilla palms in order to make new estivas [12] for the canoes, the falca being in very poor condition. They had been gone very few minutes when Filomeno thought he detected an Indian peering at them from behind some bushes on the high left bank, and called Pedro's attention to it; the old man failed to discern anything at first, but a second scrutiny confirmed Filomeno's suspicions, and the fact that there were many of them. Immediately the canoe was headed for camp, and both came running to give the alarm. The Indians, seeing themselves discovered, stood out in groups along the banks, uttering a babel of shouts and yells that completely drowned the noise of the raudal.

Directly opposite the camp a large, stout, dark, hideous individual gesticulated violently and kept shouting in an angry manner when his paroxysms of rage subsided sufficiently for him to articulate. A thick, short growth of hair adorned his upper lip, and a great tooth was suspended from the lower. He was the leader of a band of which some sixty were visible at first, but more seemed to spring up each minute, until the bank was lined with them as far up and down as we could see.

Fuentes, Ober, and I boarded the falca, whence the scene could be better surveyed, and to get ready if necessary the only firearms we had, a rifle, shot-gun, and revolver in addition to the superannuated muzzle-loader belonging to Filomeno. André, machete in hand, stood on some rocks just above the falca; the other men were grouped together in the camp, with faces stoical as they gazed steadfastly at the Guaharibos. Attempts to communicate with them in Spanish, Tupi-Guarani, Maquiritare, and Baré were equally futile, as were signs and the offer to them of some knives, fishhooks, and mirrors. André was the only one among the men who had the slightest pretensions of understanding any Guaharibo. He knew a few words, and from what he could make out the Guaharibos were implacable, going to kill and to eat, notified to us also by many of them carrying their hands to their mouths, at the same time making hideous grimaces.

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[12] Estiva is a trellis of wood put at a certain distance from the bottom of a canoe to keep supplies from getting wet and ruined.

They were a big, muscular, well-nourished-looking lot, with broad, round faces and shocks of thick black hair. A man and woman who stood far out on the left were of lighter hue with tawny or cendré hair,[13] and had less sinister expressions than the majority. My men afterward declared the woman good looking. They were completely nude, as were the others, and all but the woman were armed with long bows, arrows, clubs, and staves. No shields were to be seen.

During the attempts at parley before actual hostilities commenced, Chandless's account of his encounter with the Nauas on the upper Jurua came vividly to mind, and every effort was made to conciliate or at least establish neutral relations, before the last expedient of shooting was resorted to. Our attitude however seemed to be interpreted as weakness, for suddenly four Guaharibos on the down-river side descended the bank, ran out on a fallen tree-trunk lying in the river in shallow water, and started across, fitting arrows to their bows as they came. They meant to fight, and as the first shot was fired over their heads an arrow sent from up river landed beside me. Those crossing the river scampered back for cover. The discharge of firearms seemed to surprise and terrify them, for the bank was cleared in an instant; but it was evident from the grouping of parties up and down the river that flank movements to completely encircle us were being tried, and that our tactics had best be to break through as soon as possible and pass down river.

Camp was broken quietly and orderly, the instruments taken down, all paraphernalia stored in their usual places in the canoes, some specimens of rock and an orchid obtained, during which time it was necessary to fire to kill; and the feud which apparently has endured from 1763 still continues. To old Pedro the losses of the Guaharibos seemed fitting retribution, for they had killed his brother near the sources of the Umauaca.

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[13] Number 6 Broca scale it looked to be, while the skin of the others was number 4, the usual olive-brown, while that of the leader was near number 3.

The arrow which fell alongside me was ingeniously made, 2 metres long, the shaft of verada, the tip of macanilla palm, notched and smeared with curare; the feathers at the butt were those of the paujil, the threads for binding from the leaf of the curaua and bark of the yarumo.

What seems most likely is that the day before when we passed the bridge we were seen by some of them who gave the alarm, and a party was collected to make an attack the following night, so as to fall upon us unawares, with a result that is not pleasant to contemplate. To Filomeno's keen eyes and quick action we owe our lives.

The Guaharibos are plainly forest, not river Indians, their activities on the river being confined to throwing bridges across the Orinoco when they visit its banks in times of low water; they use neither rafts nor canoes. They are cannibal, and eat their food raw: principally wild animals and fruits of the woods, and fish which they shoot. They live in cylindrical-shaped houses with roofs tapering to a point, on the north side of the Guanaya mountains, but they neither cultivate plantations nor have dogs. They leave their houses, cross the mountains, and roam the forests to the south, west, and east during the period of low water from November to April. They understand the use of and manufacture curare, which is employed in hunting and war ; and they bury their dead in baskets, which are afterwards exhumed, burned, and the ashes preserved.

During a lull in hostilities we passed down stream, both canoes together, with heavy canvas tent-flies and tarpaulins ready to lift to protect the marineros, Fuentes and myself on the bridge in front of the carrosa of the falca, covering either bank with the gun and rifle. We reached the bridge in half an hour, passed down the raudal below the caño Bocon at 6.10 p.m. in as many seconds as it required minutes to ascend, and camped on the playa where we had breakfasted two days before, opposite the great battlement-like hill at whose base the Orinoco winds like a fosse.

In conclusion I will present briefly the results of my observations on the geology of the country.

The Casiquiare is neither the result of capture by one stream of another, nor is it the remnant of an ancient passage that served to connect an inland sea with the ocean, two premises that have been advanced by theorists.

The Upper Orinoco, in common with other rivers of tropical South America during annual periods of flood, when the rise may be anywhere from 15 to 20 feet above low-water level, frequently has its banks breached. This generally happens where the surface of the land inclines gently downward away from the river, and a cul-de-sac or reservoir results, into which the surplus water is poured during the later part of the rise and is held there for some time after the fall commences (see *Geographical Journal*, Aug. 1914, p. 153).

The Orinoco may be termed a primeval river, in that it follows the dip, as do such rivers of erosion plateaux with inclined strata. The term "primeval" implies that such rivers have persisted along original drainage lines from earliest times and through the vicissitudes of geological change. The Casiquiare is a subsequent development of such a river, due first to breaching and overflow at a point where the inclination of the land-surface is not coincident with the dip or original line of the primeval stream. Later the transition from a lake-like reservoir to a narrow channel of well-defined flow from the Orinoco draining into the Negro may well have been determined by the combined factors of small crustal dislocations, levelling up by sedimentary deposition and fluvial erosion.

Vestiges of a once extensive lake are found to-day on the east side of the canal by Lago Pasiba and the Matraca connection of the Rio Pasimoni with the Cauaburi branch of the Rio Negro, and to the west by the great morichales or swamps from which emerge the Sesecho, Caterico, and Mamoni tributaries of the Casiquiare, and by which routes water connection with the Guainia exists.

The general appearance of the country of the upper portions of the Rio Negro and the Orinoco is strongly suggestive of a plateau of erosion. There is much rock exposed, all apparently of crystalline structure and schistose texture. There is an entire absence of valleys, hills rise abruptly from the plains, either discretely or in isolated groups and knots. There is no great disparity of height, the elevation of the summits being approximately the same. The summits for the most part show smooth rounded outlines or have an undulating continuity that contrasts strangely with the bold, steep, and picturesque sides.

Some of the elevations resemble bosses or batholiths, others exhibit a well-defined scarp and dip-slope, while still others have a tabular configuration, appearing at a distance identical in appearance with horizontal, stratified rock after prolonged and extensive weathering.

The rock masses of all the Guayana region however are inclined and contorted, granitic or metamorphic in character, the much-denuded mountains, probably of tectonic origin, belonging to an early geological period and subjected to repeated cycles of hypogene processes and epigene actions. The vestiges of that system which exist to-day are the more resistant and enduring cores and stumps that have been metamorphosed into the subsequent or relict mountains which form the Parime and Pacaraima groups of Venezuelan Guayana.

EFFECT OF THE PHYSICAL FEATURES OF GREECE ON THE CHARACTER OF THE PEOPLE.

MICHAEL DORIZAS.

Greece is a land of mountains and valleys, much broken by gulfs and inlets of the sea. The mountains and mountain chains occupy about two-thirds of Old Greece (Greece of 1912). There are twenty-six elevations in the country over 3,000 feet above sea level, eight of which are over 7,000 feet in altitude.

These physical features and the geographic location of Greece were largely instrumental in moulding the character of the people. The fact that the country is broken up by the interlacing of mountain chains, by gulfs and rivers, into innumerable plains and valleys led in antiquity to the formation of many independent states and separate provinces.

When one visits the ruined sites of ancient republics and democracies, one's attention is drawn first to the remains of the Acropolis or top city, on a rock or strong position usually in the center of the territory and at some distance from the sea for fear of pirates. It was here that the inhabitants took refuge in time of danger. On looking around, one sees mountains protecting the territory, a river or two, small plains and fields of pasture, and almost always a free access to the sea—in a word each site has the elements necessary for a free community. The result was that a sentiment of local patriotism developed, which continues to be intense in the modern Greek, although local patriotism has to a great extent become subordinate to love of the country as a whole.

In these ancient sites, where the people knew each other well, the citizen—the free man—appeared, and here democracy was born. Law was substituted for command, and from here the idea of justice and equality of rights spread. The word democracy comes from two Greek words, and means the power of the people.

The Greek is therefore, as a result of his geographic environment and surroundings, very democratic and individualistic. One of the first laws passed by the legislature of New Greece was the abolition of all titles of nobility. It is true that Greece is a constitutional monarchy, but it is significant that the kings of Greece have thus far been foreigners or, if born in Greece, of foreign parentage. The first king, Otto, was a Bavarian; the second, King George, a Dane; the third, King Constantine, half Dane, half Russian; the fourth, King Alexander, the son of Constantine. Following Alexander's death, King Constantine has returned to Greece. A Greek could not rule the Greeks, even for a short time, as the extreme democracy of the Greek at times degenerates into jealousy. A Greek does not like to see another Greek rise above him, and the saying, "When Greek meets Greek, then is a tug of war," is at times verified. The kings, especially King George, were chosen because they were related to most of the influential European ruling dynasties, and little Greece needed their political support.

The Greeks, chiefly through the medium of their country, have great power of assimilation. The many different races that came into Greece, in particular the Slavs, are now Greeks. Though the Slav is not used to summer drought and the commerce of the sea, when he enters the Greek peninsula, he is found to become a Greek. The same is true of the Albanian. Even now there are in Greece Albanian colonies, where the people speak both languages, Albanian and Greek; but these Albanians are Greek at heart, with the same ideals and shortcomings as the Greeks themselves. The Albanians who live near the Greek frontier are called Epirotes. The Vice-President of the Greek Ministerial Council, Mr. Repoulis, the Commander-in-Chief of the Greek Army, General Dauglis, the Commander-in-Chief of the Navy, Admiral Condouriotis, all come from Epirote families and speak Albanian as their mother tongue. The above-mentioned dignitaries formed part of the Venizelos government.

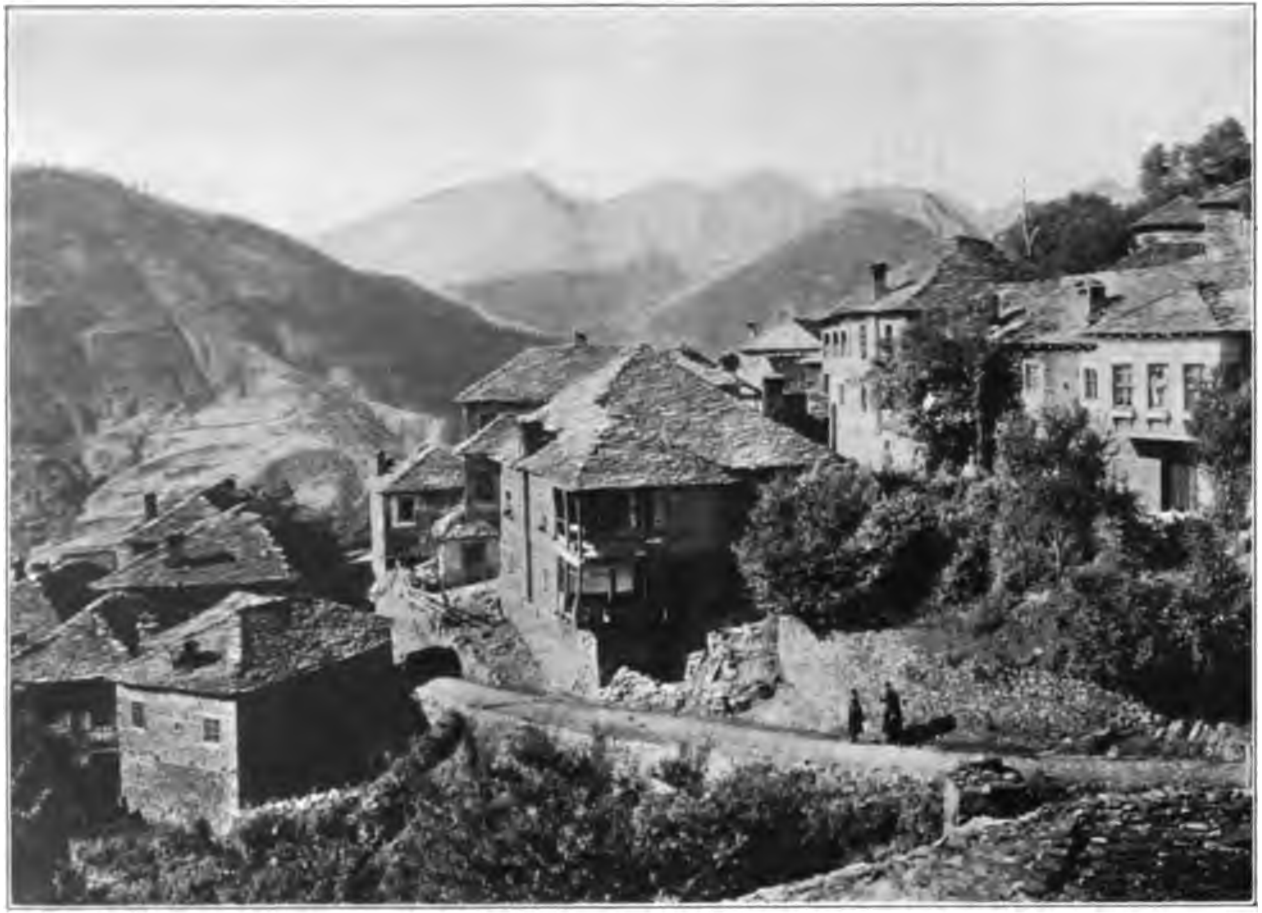
The barriers in the north rendered the Greeks relatively safe from outside attack, and kept them from expanding in that direction. The limited arable land, the uncertain rainfall, the geographic location, the extensive and indented coast line (Old Greece has about one mile of coast for every ten square miles of land), the islands which could be used as stepping stones, the blue sea inviting the people and the land pushing them forth,—all these have made of the Greeks a nation of mariners and colonizers. We find the same situation among the inhabitants of Mount Lebanon, the descendants of the ancient Phoenicians. In whatever part of Mount Lebanon the traveller may be, the sea seems to be always at his feet. The land is rough and mountainous; the inhabitants are prolific; the sea is inviting and the land uninviting, so we find the present Lebanese, under the name of Syrians, scattered in North and South America and in many parts of the Near and Middle East.

In Argentine and France it is a different story. The sea, the coast, the indentations, the good location—all are there, inviting, but the land because it is rich and extensive, is holding its children instead of pushing them away.

It is said that Greek colonizers went even as far as Ireland, after they built Marseilles at the mouth of the Rhone River in 600 B. C. In 333 B. C. Alexander built Alexandria at the mouth of the Nile; Democrates from Rhodes was his architect. Today Greeks occupy the Aegean islands, the coast of Asia Minor along all three seas, the Black, Aegean and Mediterranean, southern Russia, especially Crimea, the Black Sea ports, etc.

During my travels along the above mentioned coasts, I found the industries and commerce controlled, to a large extent, by Greeks. I found Greeks at the mouth of the Danube River, and at Galatz and Braila, at river ports, sailing the barges and owning a large part of them. In these towns, especially at Soulina at the mouth of the Danube, many Roumanians speak Greek. I found Greeks in the Caucasus and in most of the Mediterranean ports; and on a recent visit to Jericho and the surrounding country, learned that the fishermen on the Lower Jordan were Greeks. The Greeks colonized the southern part of Italy and Sicily; the Greek ruins here vie with those of Mother Greece. They colonized many islands and coastal regions of the Dalmation coast. Curzola and Ragusa are ancient Greek colonies. Some of the greatest Greek treasures I have seen were at the Hermitage in Petrograd; they came from the excavation of Kertz in Crimea. In Greater Constantinople even now there are more than 300,000 Greeks. The following table shows, approximately, the number of Greeks in the various countries of the world:

Kingdom of Greece, up to 1914	4,300,000
Northern Epirus and Southern Albania	151,000
Thrace and Region of Constantinople	731,000
Bulgaria	43,000
Asia Minor	1,694,000



METSOVO AND THE SUMMITS OF MT. PINDUS

Photo by Frederic Boissonnas, Geneva, Switzerland

MT. OLYMPUS, NEARLY 10,000 FEET IN HEIGHT

Photo by Frederic Boissonnas, Geneva, Switzerland

MT. PARNASSUS FROM VILLAGE OF ZEMENON, ACROSS THE CORINTHIAN GULF

Photo by Frederic Boissonnas, Geneva, Switzerland

Dodecanese	102,000
Cyprus	235,000
Egypt and rest of Africa	150,000
North and South America	450,000
Southern Russia	400,000

Of the 450,000 Greeks in North and South America, fully 400,000 are in the United States. This number includes Greeks from Greece proper, from Turkey, Bulgaria, Roumania and Russia.

Although the Greeks who left Greece for different countries were not in most cases of the peasant and pastoral classes, those who immigrated to America were. The bulk of the immigrants to this country come from the farming districts. It is only lately that the better and educated class of Greeks have come to America, to act as doctors, lawyers, and teachers of their kin. The Greek comes to America to ameliorate his economic condition.

As Greece is a land of mountains, many of which are of striking beauty, with an abrupt descent to the submerged coast, one finds in addition to the adventurous spirit of the mariner, the love of country of the highlander. The struggle to conquer the difficulties arising from a limited arable land has made the Greek self-reliant and thrifty. Without money, without political support, the subject of a small and until recently rather weak nation, he leaves his country and throws himself into the struggle for life, and for the most part he succeeds. There are Greek colonies in many of the European capitals, and their members are respected. But, no matter where the Greek goes, his love for his country rarely dies. As soon as a number of Greeks come together, they start a community (as the Scotch when away from Scotland start clubs), and invariably a church and a school; the church reminds them of home, and in the school their children learn their mother tongue. Greeks give freely their money, their time, their talents, for the good of their country. Athens is full of public and philanthropic institutions built with the money of Greek patriots, who became enriched outside of Greece. One who has helped his country in this way is called " national benefactor,"—a title much more esteemed than those of nobility in other European countries. Thus love for his native land is preserved although the Greek many wander far from the land of his birth.

GEOGRAPHIC NAMES AND TERMS OF SIGNIFICANCE IN PLANT GEOGRAPHY AND ECOLOGY.

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(Continued.)

Mire. Such is Muck Mire Moor near Egton, the name of which has been derived from old Norse Myrkr, signifying dark, and myrr, a moor or boggy place; in which sense "mire" is perpetually employed in North-eastern Yorkshire. *Elgee, Frank:* The Moorlands of North-eastern Yorkshire, 28 (1912).

Monte. Until the monte, or thornbush region, was entered near Cordoba. *Wrigley, G. M.:* Salta, an Early Commercial Center in Argentine. *The Geographical Review,* 119 (August, 1916).

Moor. Everywhere used for heather-clad land and in a few cases for swards clothed with grass, furze and bracken with no heather in their vegetation. I have no record of the word being employed in the German sense. I suspect that some of the low-lying moors that formerly existed in the Vales of York, Pickering and Stokesby have been swampy rather than heathery, but of this I am not yet certain. "Moor" is also used for the ling or heather itself, especially when in flower. Two or three local authors at the close of the eighteenth and the beginning of the nineteenth centuries used it as a term for peaty soil. Thus Marshall says: The soil is invariably a Black Moor. The moor of fens appears obviously enough to be composed of the decayed roots and other parts of vegetables. I may also add that "Black-a-more" is an ancient name for a large part of the district. *Fat Moor.* Used when the humus or peat is of considerable thickness 2-4 feet (about 0.5 m.) or more. *Thin Moor.* Used when the humus is thin or absent and the soil sandy or stony. Corresponds to "heath" of the south of England. The ground may be either wet or dry. *High and Low Moors.* These merely refer to the altitude above sea-level. High moor must not be thought synonymous with the German "Hochmoor." The latter is applied to peat bogs with the centre higher than the circumference, usually termed mosses in this country.

According to Canon Atkinson moor has another and more special meaning. It is used for the ling, or heather itself, particularly when in flower. At the close of the eighteenth century, there was a third use of the word, the application of which will be seen by quoting a few lines from that somewhat remarkable and little-known work, Marshall's "Rural Economy of Yorkshire," published in 1796. Speaking of the eastern Moorlands, he says: "The soil is invariably a Black Moor. The moor of fens appears obviously enough to be composed of the decayed roots and other parts of vegetables, with a greater or less proportion of sand and mud," whereas it may be inferred that moor was used as a term for a particular kind of soil in which sense Dr. Young, in his "History of Whitby," also employs the word. The word is in all essentials identical with the old Norse mor, signifying peat, turf, heath or ling, and if we look at its meaning in the Gothic languages we shall find that it is everywhere the same, though with some elasticity in its application. In Suio-Gothic, mor is a marshy place, also the undergrowth in a wood; Danish and Swedish mor, a tract of fen-land; Danish dialect, moor or mor land where turves may be cut; Anglo-Saxon mor, waste land, a moor, heath; Dutch moer, and German moor. In the last instance, however, the word is usually applied to marshy, or swampy ground, and not necessarily to land covered with heather, for which the word "Heide" is generally used. *Elgee, Frank:* The Moorlands of North-eastern Yorkshire (1912). It must be remembered that we shall use the word "moor" in its local sense, as a convenient term for all heather-clad land, heaths, moorland bogs and even in some cases grassy commons. The term "heath" perhaps best describes the larger part of the Eastern Moorlands, but it is an unfamiliar word in the North of England. "Moor," in some parts of the country, and always in Germany, is applied to swampy land, or bogs, whether they are clothed with heath vegetation or not. We shall describe how the species are grouped together to form different types of moors—heather moor, cotton grass moor, grass moor, etc. *Elgee, Frank,* 5 and 10.

Moor-pan. Known as moor-pan it extends as a hard layer, more or less horizontal, but not always visible in sections. *Elgee, Frank:* The Moorlands of North-eastern Yorkshire, 49.

Mor. The other soil "mor" arises from organic matter which accumulates on, but without mixing with, the mineral soil; decomposition is slow, bacteria play a subordinate part compared with fungi and humus acids accumulate to be washed from the raw humus to the underlying soil which is leached and impoverished at the surface and frequently has a "pan." *Smith, William G.:* Notes on Danish Vegetation. The Journal of Ecology II: 68.

Moss. The term is comparatively rare, but occurs in a dozen instances. As elsewhere, it is always applied to moorland bogs with great thickness of peat, 3-10 inches. Such moors are often called fat moors. *Elgee, Frank:* The Vegetation of the Eastern Moorlands of Yorkshire. The Journal of Ecology II: 5 (March 1914).

Moss Bogs. The bright-green moss-carpet around and below the point of issue of the springs described by Helgi Jonsson as moss bogs (Icelandic Dy), are one of the most frequently occurring and characteristic plant communities of the Arctic and Sub-arctic regions. The Botany of Iceland Part II: 551 (1918).

Muld. Of these "muld" consists of mineral soil intimately mixed with organic remains—a process effected mainly through the agency of earth worms. *Smith, W. G.:* Notes on Danish Vegetation. The Journal of Ecology II: 68.

Muskegs. One feature of the topography is the occurrence of muskegs on rather high hills where precipitation accumulates in cups dammed by the ancient rock, or by the deposit of compact clay barriers that are but slightly permeable to water. *Pulling, Howard E.:* Root Habit and Plant Distribution in the Far North. The Plant World, 21: 224 (September 1918).

Myrar. Helgi Jonsson classifies the bog vegetation into Star-grass bogs and Moss bogs. The latter, which include the vegetation along streams, or inundated ground and near springs (Dy), and also some of the moss bogs in "Warming's" definition, have been treated in the preceding section. The Star-grass bogs are again divided into Myrar and Flóar. In the Myri the ground water stands on a level with the surface, the soil contains acid humus and is so closely interwoven with rhizomes and roots that it bears one like a carpet. In the Flói, the ground water stands above the surface, the soil is muddy and produces a more scattered vegetation of *Carex* and *Eriophorum* tufts. As it is chiefly the height of the ground water which determines whether a Myri or a Flói is developed, and the Flói is formed by the filling up of a shallow lake, there occur all transitions between lake and Flói, and through further development between Flói and Myri. The Botany of Iceland Part II: 556 (1918).

Nab. On the eastern side there are similar slopes, similar mural precipices in the form of bold nobs. *Elgee, Frank:* The Moorlands of North-eastern Yorkshire, 13, 193 (1912).

Nallah. Wherever there is an outlet for storm water, the sand denudes with amazing rapidity. The banks of the rivers and streams in the sand area are complicated by a net-work of small cañon-like nallahs, called "wânghâs" in the vernacular, which further ramify and extend with each succeeding monsoon. Villages and banks of these rivers are constantly compelled to remove further inland. *Saxton, W. H.* and *Sedgwick, L. J.:* Plants of Northern Gujarat (N. W. India). Records of the Botanical Survey of India, VI: 213 (Calcutta, 1918).

Ness. A promontory or point of land projecting into the sea. Ness and force tell the same story. *Bradley, A. G.:* Highways and Byways in the Lake District, 195-196 (1903); conversely the Ness may diminish when the receding hill which supplies it slopes landwards. *Cornish, Vaughan:* On Sea Beaches and Sand Banks. *The Geographical Journal,* xi: 541 (May, 1898).

Nyika. Flanking the coast strip (E. Africa) and covering an immense area inland we encounter next the desert, or nyika, zone. The term nyika—the country of Wanyika—is used in Swahili to signify jungle or thornbush country. *Heller, Edmund:* The Geographical Barriers to the Distribution of Big Game Animals in Africa. *The Geographical Review,* vi: 305 (October, 1918).

Opoushena. See Reed Swamp.

Opslag. After rains, they tend to spread very quickly, forming part of the "opslag" type of vegetation. *Bews, J. W.:* The Grasses and Grasslands of South Africa, 103 (1918).

Outburst Bank. See quotation under delph.

Paddock. A small field or inclosure. King Alfred speaks of the world as a parrock, and as a parrock it probably lasted till changed into paddock. *Hill, Arthur W.:* Henry Nicholson Ellacombe, 255 (1919).

Pantanal. We had entered the great pantanal country, and the vast marshes teemed with bird life (on the Paraguay River, South America). *American Museum Journal,* xv: 53 (February, 1915). A fringe of trees flanked the water through which we could see the boundless wastes of pantanals beyond. *The Geographical Review,* 244 (September, 1916).

Pampa. By far the most important region of the Argentine is that known as the pampas, the flat plains that occupy the greater part of the country. The name "pampa" is of Indian origin and is given to any open level tract whether it is grass-covered or desert, in a high situation or near sea-level. *Bowman, Isaiah:* South America. A Geographical Reader, 1914: 37.

The Pampas of Pernambuco and Buenos Ayres have three times the superficial area of the Llanos of Venezuela. *Mangin, Arthur:* The Desert World, 226 (1869).

Pampero. Strong and boisterous wind which blows from the southwest. *Bowman, Isaiah:* South America. A Geography Reader, 41 (1915).

Paramo. Here are lofty paramos, or high, bleak and almost deserted plateaus which extend northward into Colombia. *Bowman, Isaiah:* South America. A Geography Reader, 276 (1914).

Patana. In the wet montane zone of Ceylon, for example, wide tongues of grassland extend into the forest, which are due to the encroachments of fires coming from the drier side of the island. Upon the cleared area a herbaceous vegetation has established itself, the remains of which form a sour humus, the properties of which are such that forest trees can, with difficulty, establish themselves. *Pearson, H. H. W.:* "The Botany of the Ceylon Patanas," Linn. Soc. Journ. Bot. xxxiv. The more open the leaf-canopy and the more scattered the trees the greater will be the impetus of the flowers, which gradually but surely kill them out, and finally reduce the area to savanna steppes. The so-called "Patanas" of Ceylon areas are an example of this. *Brown, A. F.:* Sylviculture in the Tropics, 183-184 (1912).

Paul. See Land.

Pedregal. A rough mountain slope of angular pieces of lava; a rough lava flow. In consequence of the meteorological conditions, the pedregal supports a flora made up of many representatives of the tierra fria, tierra templada and tierra caliente. *Harshberger, John W.:* Botanical Observations on the Mexican Flora, especially on the Flora of the Valley of Mexico. Proceedings of the Academy of Natural Sciences of Philadelphia, 378 (August, 1898). The surface of the country was a pedregal. *North, A. W.:* Camp and Camino in Lower California, 103 (1910).

Picocho. This lofty area is occupied by grassy meadows, timber covered swales, cross ridges and picochos. *North, A. W.:* Camp and Camino in Lower California, 269 (1910).

Pightel. See Land.

Plav is a name given by the fishermen of the Danube Delta to the floating fen of that region. It is a Russian word and signifies the floating thing or floating stuff. *Pallas, Marietta:* The Structure and History of Plav; the Floating Fen of the Delta of Danube. Journal Linnaean Society Botany xliii, No. 291 (July 1916).

Playa. Into these the streams from the mountains flow and terminate the lakes at the lowermost part of the basin formed or spread out in great flats or playas in such a manner that the waters disappear in the ground, forming what are known as sinks. *Harshberger, John W.:* Phytogeographic Survey of North America, 570 (1911).

Polder. The cultivable land recovered from the sea by dykes. Thus completing the devastation of the polder in rear of the sea-wall. *Carey, Alfred E.* and *Oliver, F. W.:* Tidal Lands, 126 (1918).

Pozo. A well curb; the border of a well in the desert. We drank abundantly, and, for the sake of future wayfarers, I planted several palm seeds about the pozo. *North, A. W.:* Camp and Camino in Lower California, 149 (1910).

Prairie. These prairies are characterized by a rich growth of grass and many flowering plants and spreading trees. *Harshberger, John W.:* Phytogeographic Survey of North America, 531 (1911).

Praz. See Matten.

Prundoae is merely Plav of small extent, but its soil is grey, that is to say almost inorganic. *Pallis, Marietta:* The Structure and History of Plav; the Floating Fen of the Delta of the Danube. Journal Linnaean Society Botany xliii, No. 291 (July, 1916).

Puna. The limit of perpetual snow is about 16,000 feet; below, to elevations of 12,000 to 11,000 feet is puna country, whose human importance is confined almost solely to the pastures. *Wrigley, G. M.:* The Traveling Doctor of the Andes. *The Geographical Review,* 186 (September, 1917).

Puszta. The Hungarian Puszta. *Herbertson, F. D.:* Descriptive Geography of Europe, 119.

Pyke. See Land.

Quebrada. A gorge, or a ravine, immediately south, the Andean valleys, peopled by tribes more civilized but no less war-like, afforded only practicable routes between plateau and plains in the quebradas of Humahuaca del Toro and Calchaqui. For ages interquebradal commerce had been carried on with the Valley of Lenna as a center. It was the meeting place for the quebrada routes and for those of Chaco and Pampas. *Wrigley, G. M.:* Salta, an Early Commercial Center of Argentina. *The Geographical Review,* 117 (August, 1916).

Quemado. C'est là aussi que les corallas étoiles d'or de minuscules Malpighiacees, less *Janusia linearifolia* Juss. Et *Camarea pulchella* Grisebach, excessivement abondants, par milliers brillent au milieu du campo brûle les "Quemados." *Chodat, R.* et *Hassler, E.:* Aperçu de la Géographie Botanique du Paraguay, 10 (1910).

Rain. See Land.

Rap. See Land.

Reed Swamp.. Kinds distinguished by Russian fishermen are Bonharnik, Ritkovina, Riceavina, Ritkovo, Triceaba, Opouskena. *Pallis, Marietta:* The Structure and History of the Plav. Journal Linnaean Society Botany, xliii: 258 (1916).

Rig. See Land.

Rigg. The Moors are traversed by characteristic and often very stony roads, the more conspicuous of which undulate through the dark green heather to the summit of the distant riggs. *Elgee, Frank:* The Moorlands of North-eastern Yorkshire, 15 (1912).

Rook. "Rook" or "Ruck," piles of stones or turves. *Elgee, Frank:* The Moorlands of North-eastern Yorkshire, 101 (1912).

Runnel. Again runnels of water from springs. *Elgee, Frank:* The Moorlands of North-eastern Yorkshire, 101 (1912).

Salar. A few of the natives make mule journeys into Bolivia for coca; some carry salt and borates from the salars of the Puna to the plains. *Wrigley, G. M.:* Salta, an early Commercial Center of Argentine. *The Geographical Review,* 122 (August, 1916). During the day these warped and buckled salt-covered surfaces called salars are extremely hot and as trying to the eyes as snow. *Bowman, Isaiah:* South America. A Geographical Reader, 115 (1914).

Saltings. When in fulness of time a vigorous mixed vegetation has arisen, occupying a level overrun by spring tides, only the marshes are termed saltings. *Carey, Alfred E.* and *Oliver, F. W.:* Tidal Lands, 164 (1918).

Sand-Draw. Sand-draws as a rule are somewhat like dry stream beds. *Pool, Raymond J.:* A Study of the Vegetation of the Sandhills of Nebraska, 248 (1913).

Savanna. A grassy plain interspersed with trees. Inland from the low coastal strip of the Guianas are the savannas or grassy plains like the llanos of Venezuela. *Bowman, Isaiah:* South America. A Geography Reader, 346 (1914).

Scar. See Sliabh.

Schone. The regions are distinguished by us as "Saltings" and "Slob lands," by the Dutch as "Schone" and "Slikke." Here they will be referred to as High and Low Marsh. *Carey, Alfred E.* and *Oliver, F. W.:* Tidal Lands, 166 (1918).

Scor. See Sliabh.

Scree. A pile of debris at the base of a cliff; talus. For Honister Crag, a rugged and gloomy mass of precipice and screes, fills the whole foreground to the left, soaring up to a height of near 2000 feet. *Bradley, A. G.:* Highways and Byways in the Lake District, 131 (1903). It is always either in river beds or on steep, sandy screes. *Thompson, H. Stuart:* Subalpine Plants or Flowers of Swiss Woods and Meadows, 14 (1912).

Selion. There are no boundaries except the last plough furrow; each strip is called a selion, a word which is connected with the French sillon, a ridge, both being derived from an old Scandinavian word, sela, to divide. Each group of selions is called a furlong, and the furlongs are named. *Hall, A. D.:* A Pilgrimage of British Farming, 102 (1913). See also Land.

Selva. I wish to enter a protest against the use of the Portuguese word "selva," as applied to the forests of the Amazon Valley in geographical literature. Selva is a Portuguese word like any other, but it is very little used and has no special application to the forests of the Amazon. The Brazilians do not distinguish the forests of the Amazon by any special word; they are called mattas, which is the word applied to any and all heavy forests alike. *Branner, J. C.:* The Word Selva in Geographic Literature. Science News Ser. xxxviii: 155 (August, 1913). See Mattas.

Sertão. In Brazil this kind of scenery is known as the sertão. *Hardy, M. E.:* An Introduction to Plant Geography, 40 (1913).

Sgeir. See Sgor.

Sgor. (Scuir and Skerry). A sea-rock from O. Ic. Sker, a rock in the sea. The names are scar and scor in England. *Mackenzie, W. C.:* The Races of Ireland and Scotland, 171.

Shamal. The climate of Aden during the north-east monsoon (October to April), is cool, and in the months of November, December and January pleasant and agreeable. During the rest of the year hot sandy winds, known as "Shamal" or northers, prevail within the crater. Vander Broeck, who visited Aden in 1614, was witness of the Shamal and described it thus: "About Monday there came upon the earth a surprising darkness, followed by heavy rain, and in the further extremity of that terrible cloud a very bright red that might almost be taken for a fiery oven. The cloud continued to roll away towards Ethiopia, the rain ceased, and we were surprised to find our vessel covered with red sand, to the thickness of a finger's breadth." Playfair says the shamal is not always accompanied by rain. *Blatter, Ethelbert:* Flora of Aden, 35 (1914).

Shaw. A good deal of the country is still covered by woodland, though the small size of the fields and the narrow hedge row timber—often indeed, narrow shaws that show the enclosure was originally cut out of forest. *Hall, A. D.:* A Pilgrimage of British Farming, 45 (1913).

Shingle. In the southern part of Patagonia a region covered with coarse gravel and small stones that go by the name of shingle. *Bowman, Isaiah:* South America. A Geographical Reader, 29 (1914).

Shot. The shots (shotts), or salt lakes, of the south of Tunis, are rather a disappointment to the traveller. *Herbertson, F. D.:* Descriptive Geography of Africa, 21.

Shrave. Valley gravel or "Shrave," as it is locally called. *Hall, A. D.:* A Pilgrimage of British Farming, 35 (1913).

Sierra. The trend of the California peninsula is southeast, and so, also, is the trend of the greatest sierra. To the north also the sierra range lessens. *North, A. W.:* Camp and Camino in Lower California, 269 (1910).

Sink. Likewise, the modern gathering of the waters in the Sink [Salton] is not to be attributed to climatic effects. *MacDougal, D. T.:* The Salton Sea. Publication 193, Carnegie Institution of Washington, 173 (1914).

Skerry. See Sgor.

Skew. "Skews," small twisted valleys such as Hole Skew near

Freeborough Hill. *Elgee, Frank:* The Moorlands of North-eastern Yorkshire, 28 (1912).

Slack. "Slacks" are shallow valleys. *Elgee, Frank:* The Moorlands of North-eastern Yorkshire, 28, 115 (1912).

Slikke. See Schorre.

Slob. The temptation to shut off areas of estuarial slob in order to make land for agricultural or other purposes is sometimes insistent. *Carey, Alfred E.* and *Oliver, F. W.:* Tidal Lands, 11 (1918).

Slog. Creeks and river channels traversing saltings are very prone to erode their banks, especially in reaches which allow some "fetch" to the wind, which often springs up when the tide flows. To protect such banks from resulting slog. *Carey, Alfred E.* and *Oliver, F. W.:* Tidal Lands, 214 (1918).

Slurry. A semi-fluid mixture of various earths. To contrast their action, ample drainage to check the tendency to the formation of subterranean pools of semi-liquid slurry is the first requirement. *Carey, Alfred E.* and *Oliver, F. W.:* Tidal Lands, 206.

Spate. A flood. In times of spate the water carries a fine silt. *Smith, W. B.:* The Improvement of Hill Pasture. The Scottish Journal of Agriculture I, No. 3 (July, 1918).

Stack. A lofty growth of cliff facing the North Sea, which has been wrenched away from it many scarred and furrowed columns of rocks or "stacks," round these the clear green water is lazily working itself into foam. *Ed.* The Extreme North of Scotland. Gardeners' Chronicle, New Series, xxiii: 9 (January 3, 1885).

Steppes. Huntington, Ellsworth: Asia. A Geography Reader, 140.

Stitch. See Land.

Strath. A valley of considerable size with a river running through. It is noticeable in Scottish topography that the dales are chiefly south of the Firths of Forth and Clyde; the straths are mainly distributed in the east and center, and the glens in the west. *Mackenzie, W. C.:* The Races of Ireland and Scotland, 292.

Sudd. Herbertson, F. D.: Descriptive Geography of Africa, 39. The Nile along most of its course is a really formidable barrier, being wide and lake-like in expanse, the margins boggy and overgrowth with a heavy growth of papyrus and other aquatic plants which form an impassable barrier of floating sudd. *Heller,* *Edmund:* The Geographical Barriers to the Distribution of Big Game Animals in Africa. *The Geographical Review,* vi:310 (October, 1918).

Swale. A slight depression. This lofty area is occupied by grassy meadows, timber covered swales, cross ridges and picochos. *North, A. W.:* Camp and Camino in Lower California, 269 (1910).

Swang. A term for moorland and other bogs; e.g., Moss Swang, Gale Swang (where Myrica grows). Usually applied to bogs in hollows; and by some etymologists it is connected with old Norse svinka, to swing or shake as a bog does. Derived from old Norse swangr, a hollow place. Moss Swang is a peat bog in a hollow. *Elgee, Frank:* The Moorlands of North-eastern Yorkshire, 28, 38 (1912).

Swash Bank. See quotation under Delph.

Swashways. On the east coast what are termed "swashways" occur opposite lines of cliff. *Carey, Alfred E.* and *Oliver, F. W.:* Tidal Lands, 39 (1918).

Swidden. A burnt area, or swidden. The vegetation of a neglected cart-track showed some interesting features. A large length of it traversed an old "swidden." *Elgee, Frank:* The Moorlands of North-eastern Yorkshire, 8, 9, 41 (1912).

Syke. A term for a small rivulet draining out of a bog or the bog itself. We have Foul Syke, Moss Syke, Seavy Syke (where Seaves: Juncus spp. grow). *Elgee, Frank:* The Vegetation of the Eastern Moorlands of Yorkshire. The Journal of Ecology II:5 (March, 1914).

Tagarete. In detail the site of Salta offered exceptional advantages for defense. It lay between two rivers and in the midst of marshes and swamps, tagaretes, impenetrable save by a few easily guarded causeways. *Wrigley, G. M.:* Salta, an Early Commercial Center of Argentina. *The Geographical Review,* 117 (August, 1916).

Tallow. See Tuloch.

Tarn. A lakelet. You would almost guess from the look of the hollow between High Stile and Red Pike that the stream issued from a tarn within their shadows. *Bradley, A. G.:* Highways and Byways in the Lake District, 134. Every gill and beck and thwaite and even tarn, which is, I believe, the Icelandic for tear-drop, recalls the thrusting Norseman. do. 195.

Taungya. See Jhum.

Teso. They are interrupted by woody stretches of land, called teso. *The Geographical Review*, 44 (July, 1917).

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Tinaja. Peculiar to the country, however, and the most frequent watering-places in Lower California are the tinajas, or natural cisterns. These are water-holes found in the rock bottoms of arroyos, where rain collects. In some of these tinajas there are thousands of gallons of water, and in them small fish and water terrapin are found. *North, A. W.:* Camp and Camino in Lower California, 330 (1910).

Tor. A lofty conical hill. It is about 7 miles above Dart Meet on the steep slope of West Dart, near its rise and near the highest tors of Dartmoor. *Evershed, H.:* Wittman's Wood. Gardeners' Chronicle, New Ser., iv: 387 (September 25, 1875).

Towan. See Meal.

Trachiotis. Trachiotis, dry land, is the name by which the inhabitants of the island indicate the steppes. This name particularly seems to be applied to the tracts which are chiefly characterized by *Sanguisorba spinosa* and other low, dwarfy shrubs. *Holmboe, Jean:* Studies in the Vegetation of Cyprus, 267 (1914).

Travesia. A dry, sandy zone on the further side of Santiago del Estero. *The Geographical Review*, 120 (August 1916).

Tundra. The treeless frozen territory of the far north; barren grounds. (North American.) *Herbertson, F. D.:* Descriptive Geography of North America, 18.

Turbary. A peat bog. The final process in the filling in of old turbaries is represented by the appearance of *Eriophorum vaginatum*. *Elgee, Frank:* The Moorlands of North-eastern Yorkshire, 88 (1912). The bog whortle berry (*Vaccinium uliginosum*) ascends even higher on alpine turbaries in Switzerland. *Thompson, H. Stuart:* Sub-alpine Plants or Flowers of the Swiss Woods and Meadows, 11 (1912).

Turves. Plural of turf.

Tussock. A small clump, or elevation of grasses, or sedges. *Marloth, R.:* Das Kapland, 365 (1908).

Tyning is another word that has long fallen out of use, but is not uncommon in field names. *Hill, Arthur W.:* Henry Nicholson Ellacombe, 244 (1919).

Urd. The *Rhacomitrium* heath is extensively distributed in many places on the taluses of fallen blocks and debris. (Urd.) The Botany of Iceland, Part II: 591 (1918).

Varzea. To the naturalist the difference between the highland forest and the swamp wood igapó (which see), of which the varzea, the swampy country in winter only, is an important variety. *Snethlage, Emilie:* Nature and Man in Eastern Para, Brazil. *The Geographical Review,* 42 (July, 1917).

Veld. An unforested, usually somewhat arid tract of land in South Africa. The preservation of such local designations serves a very useful purpose in distinguishing the separate developments in different countries of what is essentially the same type, and it is probably better to retain the South African names for the different formations, e. g., Veld, Vlei, Bush, Fynbosch, etc., rather than introduce terms from other countries, such as savanna, steppe, etc. *Bews, J. W.:* The Plant Ecology of the Drakensberg Range. Annals of the Natal Museum III, Pt. 3, 560-561 (May, 1917).

Vleys. A marsh, or morass. *Bews, J. W.:* The Grasses and Grassland of South Africa, 129 (1918).

Wall. See Land.

Wanghas. See Nallah.

Wash. It is no uncommon thing, where the remains of an ancient "wash," or river channel, have plowed up the soil. *Herbertson, F. D.:* Descriptive Geographies from Original Sources, 198 (1901).

Warp. Turning to the question of the accretion on the river side of an embankment, such accretion is usually called the "warp." *Carey, Alfred E.* and *Oliver, F. W.:* Tidal Lands, 137 (1918).

Wold. An open tract of rolling country similar to the down in England. We called upon one large farmer in the heart of the Wolds and saw the typical farming of the district about as well carried out as it could be. *Hall, A. D.:* A Pilgrimage of British Farming, 99 (1913).

Yerbal. La Zone des Yerbales. C'est là qu' abondent c'est hauts arbustes et arbres de l' Ilex paraguayensis St. Hil. *Chodat, R.*

et *Hassler, E.:* Aperçu de la Géographie Botanique du Paraguay, 23 (1910).

Many call it Paraguay tea. In South America it is called mate. In some places it covers all the mountain slopes in woods known as Yerbales. *Bowman, Isaiah:* South America. A Geographical Reader, 185 (1915).

Yungas. After crossing a ridge 6,700 feet high, the trail descends a long slope into the Yungas, properly known as the Yunghas of Cochabamba. Yungas is the name given to the fertile mountain slopes which have been cleared of forest and cultivated. *Miller, Leo. O.:* Across the Bolivian Highlands. *The Geographical Review,* 271 (October, 1917).

Conclusion.

The foregoing enumeration is presented with the hope that it will prove useful to the student and research worker in the fields of ecology and phytogeography. In presenting the list in the above form, the author believes that he has avoided the pitfalls and numerous other dangers that beset the inquirer into onomatology, for he recognizes the patent blunders, and the absurdly fanciful explanations of etymologists which have become a byword. To the person interested in the above lines of word study and place names, the following books will be found helpful in giving the principles upon which such an investigation is based, and many additional names not included in the above alphabetically arranged list.

Baker, Marcus: Geographic Dictionary of Alaska. Bulletin 187, United States Geological Survey, 1902.

Butler, James and *Holland, Robert:* A Dictionary of English Plant Names. London: published for the English Dialect Society, by Trübner & Co., 1878.

Earle, John: English Plant Names from the Tenth to the Fifteenth Century. Oxford, at the Clarendon Press, 1880.

Gannett, Henry: A Geographic Dictionary of New Jersey, Bulletin 118, United States Geological Survey, 1894.

Gerschel, J. and *Fisher, W. R.:* Vocabulaire Forestier Français-Allemand-Anglais. Oxford, at the Clarendon Press, 1911.

Heilprin, Angelo and *Heilprin, Louis:* A complete Pronouncing Gazeteer or Geographical Dictionary of the World. J. B. Lippincott Company, Philadelphia and London, 1906.

Moon, F. F. and *Brown, N. C.:* Elements of Forestry. John Wiley & Sons, New York, 1914.

Taylor, Isaac: Words and Places. Illustrations of History, Etymology and Geography, J. M. Dent & Sons, London, and E. P. Dutton & Co., New York. This book is a mine of information and should be consulted in detail by the earnest student for facts and principles. An inexpensive edition is published in *Everyman's Library.*

Taylor, Jay L. B.: Handbook for Rangers and Woodsmen. John Wiley & Sons, New York, 1917.

United States Board on Geographic Names: First Report of the United States Board on Geographic Names, 1890-1891, Washington, 1892; Second Report, 1890-1899, Washington, 1900.

Warming E. und *Graebner, P.:* Lehrbuch der Okologischen Pflanzengeographie, 3 umgearbeitete Auflage. Berlin, 1918.

Warming, Eug. and *Vahl, Martin:* Oxcology of Plants. Oxford, at the Clarendon Press, 1909.

Whitney, W. D.: Language and the Study of Language. Scribner, Armstrong & Co., New York, 1874.

GEOGRAPHIC NEWS AND NOTES

Sir Ernest Shackleton.—On January 5, 1922, occurred the death of Sir Ernest Shackleton, one of the world's greatest modern explorers. On his little 200-ton ship, the Quest, he had begun the expedition which was to have covered 30,000 miles of uncharted parts of the South Atlantic, the Pacific and the Antarctic Seas. The expedition had reached South Georgia Island, where the great explorer died. Although spending much of the last years in discovery and exploration, his fame rests chiefly on his plucky journey in quest of the South Pole in 1907-1909. At the time he located the south magnetic pole and reached a point within ninety-seven miles of the geographical pole.

President Henry G. Bryant, in a communication to the *Evening Public Ledger,* paid the following tribute to the memory of the great explorer:

"In the death of Sir Ernest Shackleton, Great Britain has lost a premier explorer, and one of the great heroes of polar discovery has disappeared from the scene of his activities.

"His name is written large in the annals of the South. After service under Scott, he organized the 'Nimrod' expedition of 1907-09, which located the South Magnetic Pole and reached a point within ninety-seven miles of the South Pole.

"This enterprise gave a great impetus to Antarctic research and led to subsequent journeys of Captain R. F. Scott and Roald Amundsen.

"During his last great expedition in the Endurance, in 1914-17, his qualities of leadership were tested to the utmost and the manner in which he acquitted himself won the admiration of the world.

"His 800-mile journey in an open boat from Elephant Island to South Georgia, where he organized relief measures, will go down in history as an epic of Antarctic adventure and heroism.

"During his occasional visits to this country Sir Ernest was a frequent visitor, to Philadelphia, where he had many friends, including the late John Howard McFadden.

"Many will recall the occasion some years ago, in January, 1913, when Peary, Amundsen and Shackleton appeared together on the stage of the Academy of Music, under the auspices of the Philadelphia Geographical Society.

"He was last here in 1918. He was also given the gold medal of the Geographical Society, which is known as the Elisha Kent Kane Medal. He died as he would have wished—in active service."

The Journal of Geography.—With the "Anniversary Number" of January, 1922, The Journal of Geography celebrates a quarter of a century in geographic education. Recognizing the need of geography teachers for a journal that was published for their benefit, Professor William Morris Davis and a few other well known geographers started the great movement that has been so useful in advancing the teaching of geography in the United States.

Many geographers have contributed to make The Journal a success but greatest tribute must be given to the untiring efforts of its editors. Except for two years, when it was under the direction of Dr. Isaiah Bowman of the American Geographical Society, its educational policies have been directed by Professors Richard E. Dodge, R. H. Whitbeck, and George J. Miller. To these men teachers of geography owe a debt of gratitude for their painstaking work. May The Journal of Geography celebrate many more quarter-century anniversaries.

Association of American Geographers.—The eighteenth annual meeting of the Association of American Geographers was held at Washington, December 29-31, 1921, in Hubbard Memorial Building by invitation of the National Geographic Society. This meeting was preceded by the annual meeting of the National Council of Geography Teachers at the same place. The excellent facilities and splendid entertainment given by the National Geographic Society added greatly to the pleasure of the meeting.

The following appeared in *Science,* February 3, 1922:

"The annual joint meeting of the American Geographical Society and the Association of American Geographers will be held in New York City on April 28 and 29. The program will be published about April 1. All interested are invited to attend the sessions to be held at the building of the American Geographical Society."

We learn from *Science* that Captain Roald Amundsen visited the Department of Terrestrial Magnetism of the Carnegie Institution of Washington on January 16, in order to complete arrangements with regard to co-operative work in terrestrial magnetism and atmospheric electricity between the Department and his forthcoming expedition to the Arctic regions. During the Northeast Passage, 1918-1921, the Amundsen Expedition made a series of highly valuable magnetic observations at somewhat over fifty different points. Captain Amundsen's chief scientific assistant, Dr. H. U. Sverdrup, has been associated with the Department of Terrestrial Magnetism since last October in order to complete the reduction and publication of the magnetic observations thus far obtained by the expedition. He will rejoin the *Maud,* Captain Amundsen's vessel, early in March at Seattle. It is expected that Captain Amundsen will resume his Arctic expedition about June 1. During his brief stay in Washington, Captain Amundsen also paid a visit to the non-magnetic ship *Carnegie.* In the evening he met at the Cosmos Club a number of the scientific men of Washington with whom he discussed the plans of his Arctic expedition, the chief object of which is to obtain scientific data relating to geography, oceanography, meteorology, gravity, terrestrial magnetism and atmospheric electricity.

New Base Map of the North Pacific Ocean.—A new base map of the North Pacific Ocean on the transverse polyconic projection has been prepared by W. E. Johnson, Cartographer of the U. S. Coast and Geodetic Survey of the Department of Commerce, and is now available for distribution. It is published in clear form and convenient size (dimens by 41 inches) for desk use. (Map No. 3080, North Pacific Ocean, scale 1 : 20,000,000, price 25 cents.)

This map is designed primarily as a base on which statistical data of various special kinds may be shown. In consequence of this purpose only features of major importance are shown on it and these features are emphasized to an extent not possible on a map which contains the vast amount of detail usually included.

In addition to the foregoing specific value this map is of general interest at present as showing the relation between the United States, its possessions, and the Far East and as including those areas around which present problems in the North Pacific Ocean are centered.

rock in the sea. The names are scar and scor in England. *Mackenzie, W. C.:* The Races of Ireland and Scotland, 171.

Shamal. The climate of Aden during the north-east monsoon (October to April), is cool, and in the months of November, December and January pleasant and agreeable. During the rest of the year hot sandy winds, known as "Shamal" or northers, prevail within the crater. Vander Broeck, who visited Aden in 1614, was witness of the Shamal and described it thus: "About Monday there came upon the earth a surprising darkness, followed by heavy rain, and in the further extremity of that terrible cloud a very bright red that might almost be taken for a fiery oven. The cloud continued to roll away towards Ethiopia, the rain ceased, and we were surprised to find our vessel covered with red sand, to the thickness of a finger's breadth." Playfair says the shamal is not always accompanied by rain. *Blatter, Ethelbert:* Flora of Aden, 35 (1914).

Shaw. A good deal of the country is still covered by woodland, though the small size of the fields and the narrow hedge row timber—often indeed, narrow shaws that show the enclosure was originally cut out of forest. *Hall, A. D.:* A Pilgrimage of British Farming, 45 (1913).

Shingle. In the southern part of Patagonia a region covered with coarse gravel and small stones that go by the name of shingle. *Bowman, Isaiah:* South America. A Geographical Reader, 29 (1914).

Shot. The shots (shotts), or salt lakes, of the south of Tunis, are rather a disappointment to the traveller. *Herbertson, F. D.:* Descriptive Geography of Africa, 21.

Shrave. Valley gravel or "Shrave," as it is locally called. *Hall, A. D.:* A Pilgrimage of British Farming, 35 (1913).

Sierra. The trend of the California peninsula is southeast, and so, also, is the trend of the greatest sierra. To the north also the sierra range lessens. *North, A. W.:* Camp and Camino in Lower California, 269 (1910).

Sink. Likewise, the modern gathering of the waters in the Sink [Salton] is not to be attributed to climatic effects. *MacDougal, D. T.:* The Salton Sea. Publication 193, Carnegie Institution of Washington, 173 (1914).

Skerry. See Sgor.

Skew. "Skews," small twisted valleys such as Hole Skew near [illegible] *Elgin* [illegible]

[illegible]

[illegible] "Stacks" are [illegible]

[illegible] eastern [illegible]

[illegible] See Scheme [illegible]

[illegible] The temp[illegible]

[illegible] for a[illegible]

[illegible]

[illegible] Creeks [illegible]

[illegible] erode the[illegible]

[illegible] the w[illegible]

[illegible] such [illegible]

[illegible]

[illegible] -ation, an[illegible]

[illegible] -terranea[illegible]

[illegible]

[illegible] *Hypogeum* [illegible]

[illegible] along [illegible]

[illegible] with an [illegible]

[illegible] with a heav[illegible]

[illegible] an impassab[illegible]

Edmund: The Geographical Barriers to the Distribution of Big Game Animals in Africa. *The Geographical Review,* vi:310 (October, 1918).

Swale. A slight depression. This lofty area is occupied by grassy meadows, timber covered swales, cross ridges and picochos. *North, A. W.:* Camp and Camino in Lower California, 269 (1910).

Swang. A term for moorland and other bogs; e. g., Moss Swang, Gale Swang (where Myrica grows). Usually applied to bogs in hollows; and by some etymologists it is connected with old Norse svinka, to swing or shake as a bog does. Derived from old Norse swangr, a hollow place. Moss Swang is a peat bog in a hollow. *Elgee, Frank:* The Moorlands of North-eastern Yorkshire, 28, 38 (1912).

Swash Bank. See quotation under Delph.

Swashways. On the east coast what are termed "swashways" occur opposite lines of cliff. *Carey, Alfred E.* and *Oliver, F. W.:* Tidal Lands, 39 (1918).

Swidden. A burnt area, or swidden. The vegetation of a neglected cart-track showed some interesting features. A large length of it traversed an old "swidden." *Elgee, Frank:* The Moorlands of North-eastern Yorkshire, 8, 9, 41 (1912).

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Turves. Plural of turf.

Tussock. A small clump, or elevation of grasses, or sedges. *Marloth, R.:* Das Kapland, 365 (1908).

than at any other place in the world. He points out many errors in the old rainfall maps, resulting from insufficient data.

The largely increased number of rain gauges established in recent years shows that the distribution of rainfall is very complex, but in general for the country south of Valparaiso the rains are induced by the moisture laden winds from the Southwest condensing on the western slopes of the mountains, which are always very wet, while the eastern slopes are much dryer.

HENRY PAUL BUSCH.

George McCutchen McBride. *The Agrarian Indian Communities of Highland Bolivia.* American Geographical Society—Research Series No. 5. New York—Oxford University Press. 1921. Pp. 27, illustrated.

This little pamphlet sets forth briefly, but very clearly the Indian community life in Bolivia, the chief remnants of which now exist on the eastern shores of Lake Titicaca in the Department of La Paz. Their very strong attachment to the land and their continued communal life, through many centuries, distinct from the several governments under which they lived is remarkable and very interesting.

HENRY PAUL BUSCH.

Bailey Willis. *Northern Patagonia—Character and Resources.* Published by the Ministry of Public Works, Bureau of Railways, Argentine Republic, 1914. Pp. 464, with numerous illustrations.

Also Vol. II., being a portfolio of maps.

This elaborate work is a description of a survey broadly conceived and successfully carried out. The Argentine Government, wishing to develop northern Patagonia, arranged with the U. S. Geological Survey, who assigned Mr. Willis in 1911, to organize a commission for a survey. The first work was for the extension of the railway line west from San Antonio to the Chilian border. The work of the commission was much further developed to exploring the various resources of the country, mineral, water power agricultural, etc. The line lay westward from the Atlantic in approximately 41° south latitude about 350 miles south of Buenos Ayres. On reaching the mountains, which promised much greater possibilities, the survey was extended north and south over a distance of 240 miles. It covered a total area of 12,000 square miles. Elaborate studies of the resources were made, and the result stated with detailed tables of rainfall, prevailing winds, and other data.

This work will be for all time the foundation of commercial development in that part of South America.

HENRY PAUL BUSCH.

Mark Jefferson. *Recent Colonization in Chile.* American Geographical-Research Series No. 6. New York, Oxford University Press, 1921. Pp. 52, with illustrations and maps.

This little pamphlet is another production of the American Geographical Society's expedition to the A. B. C. countries in 1918. The brief stay in

Chile was well utilized. The author writes very clearly and concisely. The development of the present Chilean race is outlined and the point clearly emphasized that there are two distinct classes. The Governmental class is distinctly aristocratic. The relation of the landless working class is similar to that of feudal times. The efforts to bring in foreign colonists have been only partially successful. The first comers, a few Germans, in the middle of the last century, made quite an impression on the people. Later comers have not been well selected and there has been much trouble between various nationalities. The Germans are few in number and much scattered.

Attention is called to the very small proportion of the country which is productive. The excessively dry north and the excessively wet south leave only a small area south of Valparaiso with comfortable living conditions, and this area is now very thickly settled.

HENRY PAUL BUSCH.

Ansel F. Hall. *Handbook of Yosemite National Park.* A Compendium of Articles on the Yosemite Region by the Leading Scientific Authorities. 347 pp., illustrations and maps. G. P. Putnam's Sons, New York and London, 1921.

To the writer, who visited the Yosemite Valley a number of years ago and had the pleasure of botanizing there with the veteran Californian botanist, Prof. J. G. Lemmon and his wife, the perusal of this book has been with considerable profit. Everything that the general tourist and naturalist wishes to know about the Yosemite National Park is provided by specialists, men who know the country by many visits and love it. In the various chapters of the book the history, the Indians, the ideals and policy of the national park service, the administration, the geology, the life zones, the animals, the trees, the giant sequoia, the flowers are treated of by scientists, who have investigated in a detailed manner the natural history of the region. Directions for camping, mountaineering, and motoring in the park are given. The illustrations and maps have been well selected.

JOHN W. HARSHBERGER.

Allen Chamberlain. *Vacation Tramps in New England Highland.* 164 pp. with illustrations and maps. Houghton, Mifflin Company, Boston and New York, 1919.

This little book has been provided as a guide to those who wish to spend a summer vacation on foot, with pack on back, wandering through the mountainous districts of New England, the trampers' paradise. The hiker's kit is described, and then the trails and scenic features of the Green Mountains of Vermont, the White Mountains and the Katahdin (Ketté-Adene-the pre-eminent) region of Maine. This guide is indispensable to those who love to follow the forest trails of the New England States.

JOHN W. HARSHBERGER.

Elon Jessup. *The Motor Camping Book.* 219 pp. with maps, diagrams and illustrations. G. P. Putnam's Sons, New York and London, 1921.

Several treatises on caravaning have been published in England where that sort of outdoor, gypsy life is popular. With the advent of the automobile and the possibilities of extended travel which it provides, attention has been directed to adapting it to camp life along the road. The book by Jessup describes the most approved equipment to utilize the automobile in motoring and camping. He describes the kits to be used, sleeping in the car, motor camping tents, the camp trailer and other interesting phases of motor camping. The book is copiously illustrated with suggestive pictures.

JOHN W. HARSHBERGER.

Findlay Muirhead, M.A., F.R.G.S. Edited by. *"England."* London. Macmillan & Co., Ltd. Paris: Librairie Hachette & Cie. 1920. Pages lxxii, 598.

This is the second volume of "The Blue Guides." The first, on "London" did not come to our attention. Volumes on "Belgium and the West Front" and "Paris" are in preparation.

The series is obviously intended to be extended and replace the long familiar Baedeker. While comparisons are not always desirable, it is difficult in considering a Guide Book like this to altogether purge one's mind of its scarlet hued predecessors,

We certainly wish every success to this present venture, and from the sample before us, believe that success is well merited. The general arrangement follows tradition, but it is interesting to note motor routes are given considerable attention, and that there is also a chapter on Aviation. The typography is elaborate and excellent, the use of bold face being especially convenient. The maps by John Bartholomew & Sons, Ltd., of Edinburgh, closely resemble those furnished by the same firm for Murray's Guides, many details of style being taken from the British Ordnance Survey Maps. They are very clear and distinct, and if the pleasant green ground tint were a little lighter it would add to their legibility.

The volume is particularly well furnished with plans of towns, and the numerous Cathedrals and important Parish Churches.

The present volume covers England, the Isle of Man and the Channel Islands only. It does not touch on Wales, Scotland or Ireland.

For size it is convenient for the pocket—4½ x 6¾ x 1½ inches, though in this particular the thickness is quite the limit for such use, and if in later editions it is desired to add any more material, thinner paper should be used, or better, the volume divided.

Altogether, "The Blue Guides" will be a very welcome addition to books of this kind, and it is sincerely hoped they will prove commercially successful, and be extended as to territory with frequently corrected editions.

It is very gratifying to note that there are no advertisements.

HENRY PAUL BUSCH.

Sir Clements R. Markham. *The Lands of Silence:* A History of Arctic and Antarctic Exploration. Many illustrations. Cambridge, England, The University Press, 1921.

This large and handsome book is a long desired compendium of polar explorations. It is stated by those who knew him best, that the late Sir Clements Markham held research in polar regions dearest to his heart of all the many subjects in which he was interested. In January, 1916, when Sir Clements was killed in an accident, this labor of love on his part was practically completed. On account of the war, the appearance of the volume was delayed until the present.

Even the title of this volume scarcely gives the proper idea of its richness and value. No other work on the subject has half the authority and completeness of this. It is a book to be read for its sheer romantic interest. The best account of the ancient astrolabe is here. The chapter on the Norsemen in Greenland collates all available information. In these pages figure the men who have forever imprinted their names upon the polar maps. Frobisher, Davis, Baffin, Hearne and MacKenzie, become real to our fascinated imagination. Of course Sir John Franklin, Nansen, Peary, and the latest explorers of Greenland, also receive due notice.

In Antarctic exploration, Captain Cook, our own unappreciated Wilkes, Weddell, Sir James Ross, Borchgrevink, Charcot, and many others, receive proper chronicling of their deeds. The most recent explorations, those of Scott, Shackleton, Amundsen, and Mawson, form a fitting close to this monumental volume. If any exception could be taken to Markham's account of any of these heroes, it might be said that he gives comparatively slight credit to Sir Ernest Shackleton, so lately passed away. Perhaps a trifle of jealousy for a free-lance adventurer may enter into the reckoning.

Confronted with a work such as this, however, any slight criticism by the reader seems an act of ingratitude to the geographer who patiently and skillfully constructed this storehouse of interesting information.

WALTER LEFFERTS.

ACTIVITIES OF THE SOCIETY.

LITTLE ZION CANYON: A RAINBOW IN THE DESERT.

Mr. Stephen S. Johnson inaugurated the Society's lecture sessions on the evening of November 2, with an address on the newest of our national parks which is located in southwestern Utah.

Long known to the Mormons, this secluded valley, distant a hundred miles from a railroad, has now been made accessible to the traveling public by the construction of good roads, and camps and, in the opinion of the speaker, is destined to rank among the foremost of the National Parks for scenic grandeur. The notable feature of Mr. Johnson's address was undoubtedly the illustrations which in vividness of color excelled anything recently seen here. They depicted the remarkable forms of the sandstone pinnacles and cliffs of the canyon—the result of sand and water erosion—to which the brilliant coloring gave additional glory. The speaker won the favor of his audience by his breezy, sympathetic, and, at times humorous account of the Mormon inhabitants of Zion Canyon and adjacent portions of Utah, concerning which region his repeated visits have made him an accepted authority.

CAMPING IN THE HIGH SIERRA.

At the intermonthly meeting on November 18, President Bryant described his recent journey by pack train on the John Muir Trail from the Giant Forest to the Yosemite Valley.

Typical views of the great trees in the Sequoia National Park were shown, and the speaker then conducted his hearers through the superb scenery of the Kern River and Kings River Canyons. A detour brought the party to Mount Whitney, the highest summit in the United States proper (14,501 ft.) and the southern terminus of the trail. The ascent of this eminence presented no mountaineering difficulties except those caused by the rarified air, and the comprehensive view from the summit well repaid the effort. The three hundred mile journey covered the greater portion of the proposed Roosevelt National Park and the accompanying views—showing snow-capped peaks, swift flowing rivers, glacial lakes and flowering, alpine meadows emphasized the wisdom of setting aside this mountain wilderness as a playground for the people. The speaker closed with an eloquent appeal to his hearers to aid the friends of the National Parks in their efforts to protect these national domains from the forces of commercialism which seek at times to despoil the fair aspects of nature for selfish purposes.

THIRTY THOUSAND MILES IN CHINA.

The prominence of Chinese affairs in recent international discussions made the address of Dr. Charles K. Edmunds on the evening of December 5, of timely interest.

Extensive travels in all the provinces of the empire undertaken in connection with the survey of the Carnegie Institute, qualified the lecturer to speak with authority on his subject. His hearers followed him with sustained interest as he described journeys to remote portions of the country rarely visited by foreigners. Dr. Edmunds utilized every available means of transportation—railroads, carts, canal boats, junks, and mules—in his travels, which extended from Yunan to Mongolia and from the sea to the borders of Thibet. After listening to his running comments on land and people, accompanied as they were by a wealth of illustrative material, one realized that China was a country of vast possibilities, suffering at the present time from internal dissension and a weak government. The success and wholesome activities of the Canton Christian College were described and illustrated as a promising indication of progress.

ORIENTAL SOUTH AMERICA.

On a previous occasion Mr. Harry A. Franck lectured to us on his adventurous foot-journey down the Andes from Bogotá to Lima. On January 4, he discribed more recent travels in "Oriental" or Eastern South America. Following his bent for inland voyaging, Mr. Franck conducted his hearers from southern Argentina, through Uruguay to Brazil, where he spent many months in extensive travel in connection with an amusement enterprise. Special interest attached to the recital of his hazardous journey to the headwaters of the Amazon beyond Manaos, from whence he traversed the little-known regions on the borders of Venezuela and British Guiana—eventually returning to civilization at Georgetown. In the concluding portion of his lecture glimpses were given of scenery and conditions in the French and Dutch Guianas.

THE PASSING OF THE OLD WEST

Charles Wellington Furlong

Departing from his chosen field as a lecturer on South American subjects, Mr. Furlong invited his hearers on January 20th, to a study of that interesting phase of our history which centered around the activities of the Western cowboy.

The historical development of the cattle industry was briefly sketched and typical views shown illustrating pioneer conditions in the Northwest in early days. The major part of the lecture was devoted to a description of the annual Round-up which is held at Pendleton, Oregon. This community undertaking which had its origin in a desire to preserve the skill, the daring and the romance of pioneer days, is now an established institution and draws visitors from all parts of the country. As a participant in the cowboy tournament, the speaker gave a realistic description of the feats of endurance and skill which made up the program. The cowgirl competitors showed to advantage and the presence of a band of Indians added a picturesque element to the picture. The accompanying moving pictures gave additional realism to a most spirited and unusual address.

FURTHER EXPLORATION OF THE KATMAI REGION—ALASKA

ROBERT F. GRIGGS

Following an earlier address some years ago, Professor Griggs, on the evening of February 1st, delivered a lecture which brought up to date his investigations of the remarkable conditions resulting from the eruption of Mt. Katmai, in 1912. Professor Griggs recalled to his hearers the character and extent of this upheaval which apparently was one of the most desolating ones which has occurred in historic times. The remoteness of the volcano from the centers of population explained the absence of attendant human fatalities; but the effects of the eruption had been most marked in changing the topography of the surrounding region and were responsible for the formation of the adjacent depression known as "The Valley of Ten Thousand Smokes." A considerable amount of volcanic ashes fell on Kodiak Island, one hundred miles distant from the volcano.

The two rolls of motion picture films shown, depicting the countless steam fissures, fumaroles and mud basins of this modern inferno, aroused unusual interest in the large audience present.

The various expedients resorted to by members of the party to maintain themselves in the inhospitable region where they pursued their investigations, added to the human appeal of a discourse replete with information and interest.

EXCURSIONS.

A goodly number of members assembled at the Sixty Ninth Street Station at 1 P. M. on October 22, where they took the car for Florida Park. From here, in company with the members of the Botanical Society of the University of Pennsylvania, participants were conducted under their respective leaders, on a delightful three-mile walk along the borders of Crum Creek to its source near the Paoli Monument. A train boarded at Malvern brought the members to the city in the late afternoon.

Ideal weather and efficient arrangements combined to make the all-day outing of October 29, one of the most enjoyable excursions in recent years. An early morning train from the Reading terminal brought some three score members to Norristown, where auto busses awaited the party. An exhilarating ride brought the travelers to the quaint, colonial church at Trappe, which by its architectural simplicity and historical associations claimed their interest for half an hour. The unique geological formation near Pottstown, known as the Ringing Rocks, was the next point on the itinerary. Here an *al fresco* lunch was indulged in. The picturesque Falls of French Creek was the next objective. Here a brief discourse, prepared by a resident, relating to the early history and present-day quarry industries of the place was read. The auto busses then transported members and guests to Norristown, from whence the trains of the Pennsylvania Railroad returned the excursionists to the city.

In accordance with a resolution of the Council of the Geographical Society of Philadelphia, at its meeting on February 8, 1922, the following minute was ordered to be incorporated into the record of the meeting:

The members of the Council have learned with profound sorrow of the death of Sir Ernest H. Shackleton on January 5th, last, while on board his steamship, "The Quest," which had recently arrived off South Georgia on the threshold of the Antarctic regions.

In common with others who were brought into personal touch with this gallant explorer, we mourn the passing of a born leader of men, who achieved much for science on his three expeditions to the Far South and endeared himself to hosts of admirers by his fine qualities of heart and mind. Seldom were the attributes of command and leadership so blended with the idealistic spirit, of the knight-errant as in him. We cherish the memory of his association with our Society as Honorary Member and Gold Medalist, and unite with his countrymen in mourning the passing from the scene of his earthly activities of one of the great heroes of Antarctic discovery.

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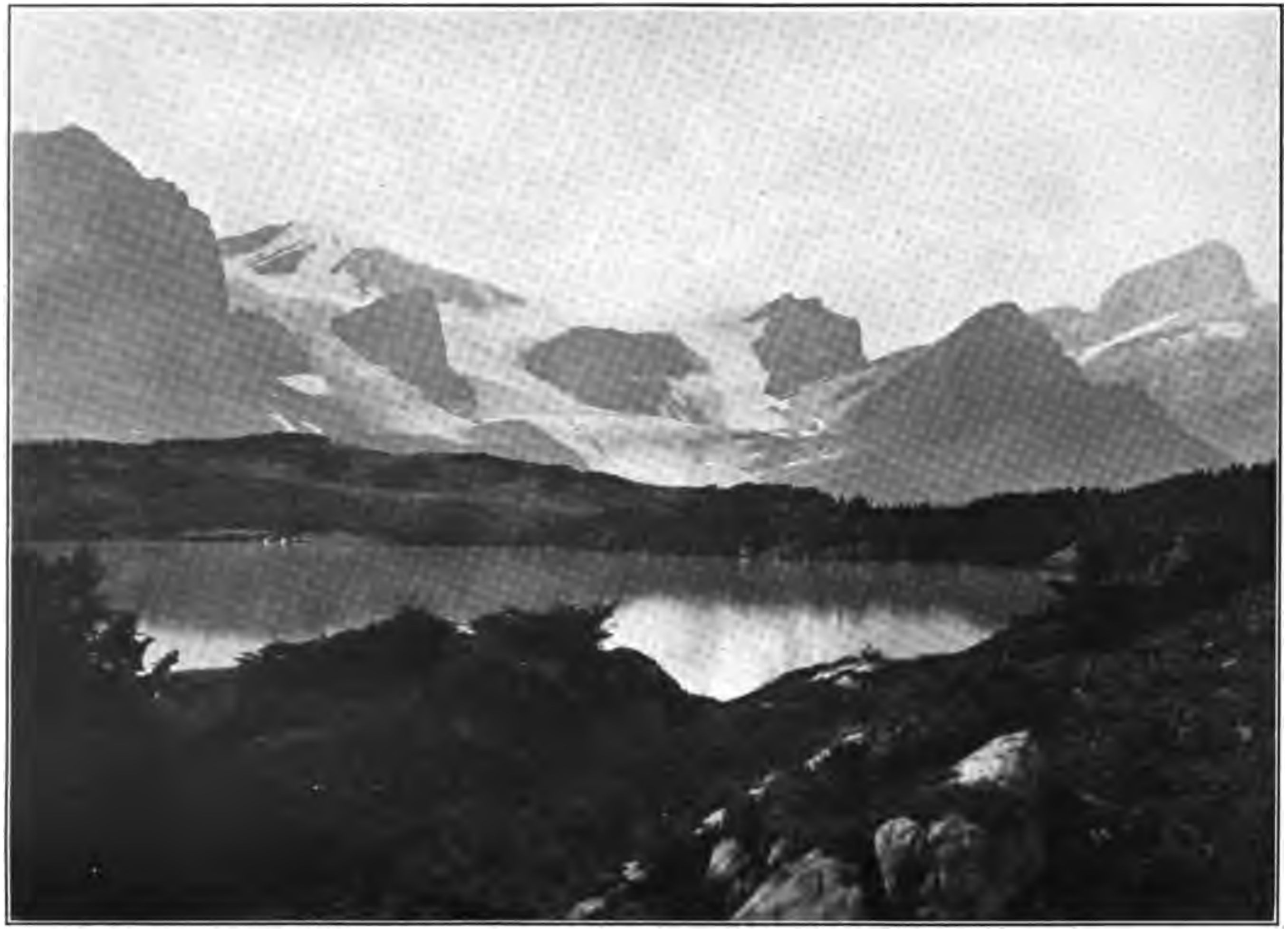


LAKE GWENDOLYN, ONE OF THE SOURCES OF THE RED DEER RIVER, ALBERTA, CANADA.

THE VALLEY OF THE HIDDEN LAKES.

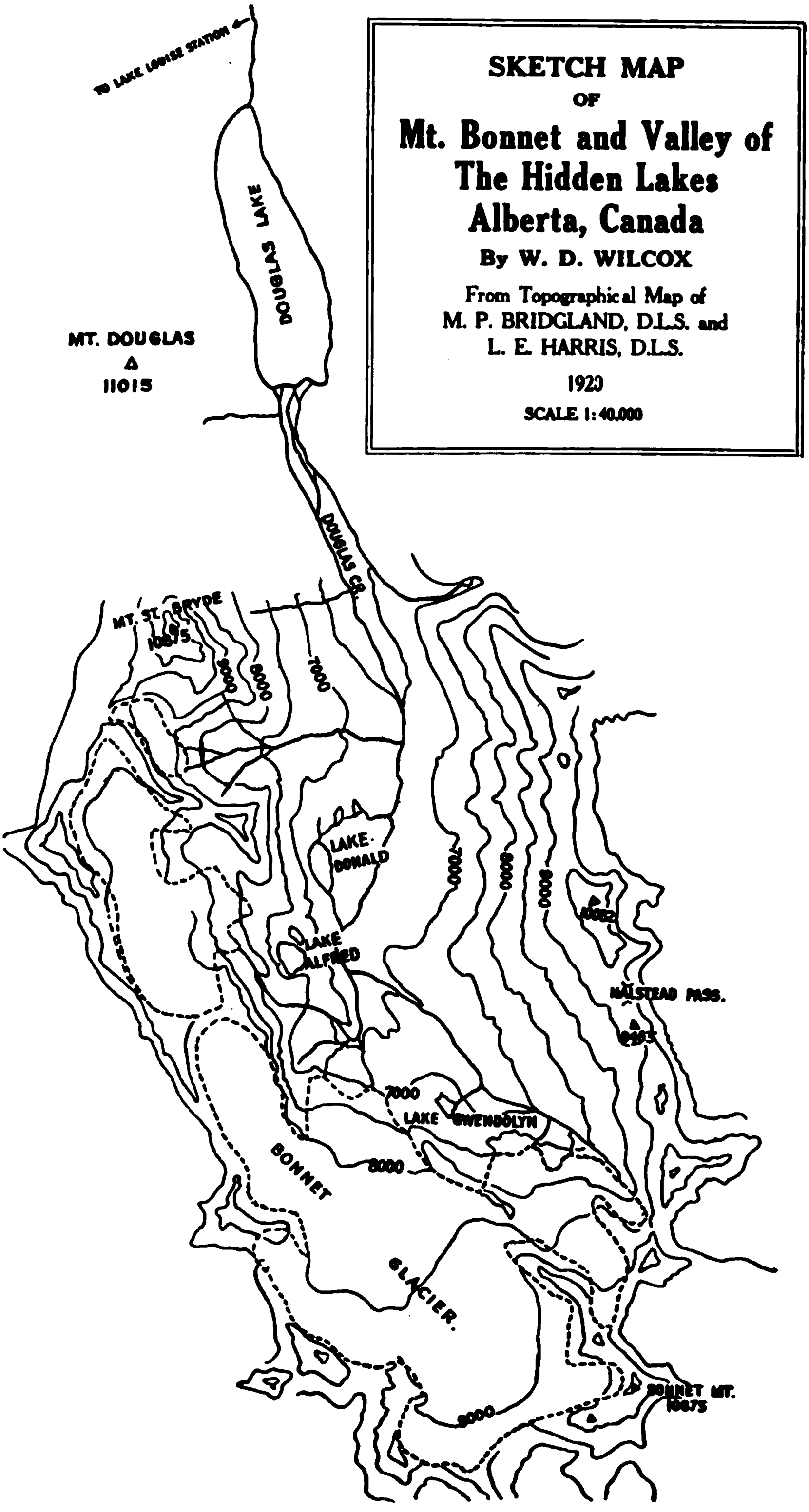
WALTER D. WILCOX.

One of the chief attractions of the Canadian Rockies is that they still possess little areas here and there, many of them quite near the railroad, that have never been explored. Even to the tourist who walks a few miles into the woods from the great hotels at Banff and Lake Louise, there comes a feeling of being in a primitive wilderness where the possibility of meeting bears or Indians or other imaginable dangers gives a delicious feeling of insecurity and adventure. The idea of penetrating still further into the mountain fastnesses and of finding some region hitherto unseen by any human visitor, in a word of being "Monarch of all he surveys," for a time at least, makes an appeal too strong to be resisted by the real nature lover.

A remarkable example of the proximity of such little known places came to the writer's experience last summer. The region in question is not more than twenty miles from the Chateau Lake Louise, and lies in the next range to the east from that famous resort, in the limestone mountains of the Slate Range. It is the valley of a stream that is one of the principal feeders if not the true source of the Red Deer River. At its end, Bonnet Mt. (10615 feet altitude) is a conspicuous landmark and the Bonnet Glacier, more than three miles long, is the source of the principal stream. Further down the valley rise the two peaks of Mt. Douglas, each about 11,000 feet high, which from their difficulty caused such à stir among mountain climbers a few years ago.

That no one, apparently, had ever entered this valley seems little less than a miracle. Located in such a comparatively well travelled region as the valley of the Red Deer River and visible from the main trail and from surrounding peaks one marvels that it had not been well known for years. Its area was indicated by a blank on the latest available maps and no one of the old timers could be found who claimed ever to have entered the valley. Every one agreed that the lower part of the valley was swampy and difficult of access and so in the multitude of other wild places it had been passed by and neglected. Obsessed by the idea of a muskeg at its mouth, impassable for horses, my friend A. L. Castle, Albert Halstead, Jr., and the writer had made, five years previously, a complete circuit of the surrounding mountains trying to discover some easier entrance. We found it completely enclosed by a continuous rampart of mountains. We did, however, get one glorious vision of this mysterious region after having climbed up from the head of the Panther River and after having reached an altitude of 9000 feet on the afternoon of a day crowded with adventure. This was indeed the banner day of our trip and one whose memories will never fade for any member of our little party. Imagine three worn and weary travelers, shaking somewhat at the knees but with hearts beating high in hopes and expectation as they approached the crest of a ridge where a view probably unseen before was suddenly disclosed. Some one shouted "There's Bonnet Peak" and as we ran eagerly forward and a little down the further side, a smiling picture of glaciers, lakes and forests lay before us. It would have been very easy, besides being a very pleasant thing, to have run down the long scree slopes two or three thousand feet into the new valley, but we were miles—how many we did not realize at the time—from our camp which we barely reached at nightfall. Bad weather and heavy snow prevented further attempts that season.

Memories of our first trip still lingered and again last summer (1921) Mr. Castle and I decided to enter the valley by its natural entrance, muskegs or no muskegs. Leaving the Canadian Pacific Road at the station of Lake Louise, we ascended Corral Creek and passing Ptarmigan Lake, whose wild and barren grandeur was enhanced by a brief shower of hail and thunder, we camped after a march of twenty miles at the game warden's hut in the Red Deer Valley. On the second day's march about noon we forded the Red Deer and struck east across the lower flanks of Mt. Douglas. Our packer, Stephens, had never seen this region before but he was an expert with pack-horses and showed the utmost patience and good judgment in finding a way through the timber. We had many ridges and side valleys to cross and for part of the time we could not see our bearings in the thick forest. After about two hours, however, we realized that we were nearing the top of the principal ridge and shortly after this to our great joy we saw the waters of the large and muddy Douglas Lake lying below us. Glimpses through the forest showed the entire valley which we had first seen five years



SKETCH MAP
OF
Mt. Bonnet and Valley of
The Hidden Lakes
Alberta, Canada
By W. D. WILCOX
From Topographical Map of
M. P. BRIDGLAND, D.L.S. and
L. E. HARRIS, D.L.S.
1920
SCALE 1:40,000

previously and it certainly was a beautiful sight. Descending rapidly we came out on the shore of the lake where a faint game trail aided us in skirting its shores. The only sign of human handiwork were axe marks on some of the trees, which, judging by the subsequent growth, we estimated to have been made not less than twenty years previous to our arrival. Beyond the lake there was no sign of axe or fire, of horses' hoofs or camp site and it seems more than likely that we were the first party ever to have entered and camped in this valley if we except some Indian hunting expedition.

The day of our arrival was one of the most perfect I have ever seen. The air was full of ozone and the fragrance of pines after a night of rain. The sky was cerulean blue above, and green near the horizon, while cumulus clouds threw purple shadows over the gray mountain slopes and forests. We could hardly keep up with our horses in our endeavor to get photographs of the ever changing and exquisite views. The lake is about two miles long and arrived at its end we came out on hard gravel washes where the river sweeping back and forth had leveled the valley floor somewhat like the gravel washes of the Saskatchewan and the Athabasca further north. Instead of muskegs and other difficulties we found a level surface so hard and smooth that one could have driven an automobile for long stretches over it.

Now that we were in the valley proper we soon realized that we were surrounded by no ordinary scenery. Every detail was cast in a large and inspiring mold. The cliffs rose in tremendous leaps more than 5000 feet above us and their lower flanks were covered with a virgin forest untouched by fire. The only bad feature was the almost total lack of grass for our horses, and, after skirmishing around in several side pockets in vain, we sent Stephens up the main stream but he came back and reported that a canyon and beyond it a glacier seemed to block our way. So we camped in the woods in early afternoon with the idea of making further explorations the next day on foot.

After lunch Castle and I scrambled up the slopes near our camp so as to get a better view of the country ahead of us. It has always been my experience that more can be learned about a new country from a height than by going along the lower levels. Of course from a height it is not possible to learn many important details such as the location of trails, fords or other items, but one can get a general idea and pick out alternative routes so that in case one is blocked another can be utilized. We climbed through thick forests of beautiful timber a thousand feet or so and came out on open limestone slopes from which we commanded an extensive view. About a mile above camp the gravel flats came to an end and, as Stephens said, there was a sort of canyon. We noticed something very peculiar about it, however, and it reminded me of those landslides that are more or less common to the Canadian Rockies such as in the Simpson Valley near Mt. Assiniboine. Immense blocks of stone were scattered about and the main stream seemed to force its way through them, though its location was concealed by the forest. Beyond the canyon another level stretch appeared and then beautiful slopes sparsely timbered led up to the foot of a large glacier gleaming like silver in the sunlight. Our hearts were immediately set on this region for a camp and we discussed plans for moving the next day so as to have the advantage of being in the midst of so many interesting places that invited exploration. We hastened back to camp and advised the men of our change of plan. Our tepee was well lined with balsam boughs whose fragrance mingled with the aroma of the camp fire smoke and later on with the odor of frying bacon and sundry items that made a very powerful appeal after our long day's march. We managed a bath in the icy water of a nearby stream and then after a nip of Scotch sat down to a splendid repast. Presently the chill of night fell over the forest, the stars twinkled amid the evergreens and the crackling fire within the tepee threw shadows of our figures on the canvas. At length the fire died down, our voices were hushed in slumber and no sound except the distant murmur of the glacial stream disturbed the silence of a wilderness never before broken by a human visitor.

The next day proved a continuation of the fine weather we had enjoyed on our arrival. While the men were packing, Castle and I went on ahead with the idea of finding a route through the rock slide. Skirting the banks of the stream for a mile or so we reached the scene of a great catastrophe in some former age, though it must have occurred since the last retreat of the glaciers. There were immense blocks of blue or yellowish limestone piled up in wild disorder and forming, in some places, grottoes secluded from sunlight and hung with ferns. Tall spruces grew among or on top of these massive blocks of nature's architecture and with the distant peaks and glaciers appearing between them made a landscape that was most unusual and attractive. The valley stream leaping in foam from one level to another in a small canyon added its wild voice that seemed to harmonize with the character of the place.

While Castle was photographing in the canyon I went a little further and reached a point where the upper part of the valley opened to view. From here the large glacier at the valley end appeared far more impressive and an ideal landscape was disclosed over and above the winding stream now glistening brightly in the sunlight. Absorbed in the beauty of the scene, I was quite unaware of something that was observing me with hardly less interest. Turning slightly to one side, I saw a splendid buck standing only a few yards from me, with head and antlers raised high, and regarding me, apparently, with the utmost astonishment and curiosity. We continued to gaze at each other till at length the beautiful creature bounded away. A short way down the trail he almost ran into Castle, who was sitting with camera in hand but had no time to get a snap shot. Meanwhile we heard the bell of our pack train and could descry our horses approaching. The buck continuing his flight encountered our file of men and horses and for an animal that had probably never before seen a human being it must have been a rather strenuous day.

There was not the slightest difficulty in getting the outfit through the slide and we advanced rapidly over gravel washes and then followed a side stream through willow and alder bushes where we saw two more deer. Arrived at the final slopes of the valley, we entered a magnificent forest of very large spruce trees where from time to time we paused to admire the perfect symmetry and proportions of some of the larger trees. Splashing through shallow streams we began a sharp ascent of the forested slope and soon began to enjoy views of the entire upper part of the valley. The horses made faster time than we, and Stephens stopped from time to time to admire the views. His picturesque figure with leather shaps and gayly colored bandana made a typical picture of the west. We were on the edge of a high bank which rose 500 feet or more from a torrent below, and beyond it and not more than a mile distant the immense tongue of the Bonnet Glacier descended below tree line. The great amphitheater of peaks made an encircling wall of fine proportions, everywhere hung with glaciers and streaked with

LOOKING UP VALLEY FROM NEAR DOUGLAS LAKE.

VIEW OF UPPER VALLEY AND BONNET GLACIER.

foaming streams and waterfalls. Stephens could not restrain his admiration, but held the horses back and said: "Well, I have traveled a lot through these mountains, but have never seen anything finer in the Canadian Rockies." It is difficult to make comparisons, but we were much inclined to agree with him.

As we reached an altitude of about 7000 feet we came to more open country and ascending a final ridge looked down into a little side valley a mile or two in length which at the time seemed one of the most charming places I have ever seen. It was perfectly green, watered by a pretty stream that came from snow-banks and was encircled by rugged peaks. The trees grew in little clumps scattered here and there through the open reaches and the whole place had the peculiarity of appearing neat as though it had been trimmed and cared for by some expert gardener. No dead trees or ancient stumps marred the scene or even suggested the primitive widerness. Enchanted with what seemed an ideal camping place, we descended a quarter mile, unpacked the horses and soon had a fire going and the teapot boiling.

So far we had not seen a single one of the three or four lakes that had made so much of an impression on us five years before. It seemed more than likely that one of them was located on a bench about 500 feet above us to the south. After lunch Castle and I ascended the steep grassy slope in that direction, and passing through spruce brush covered with the white wool of the wild goats, we followed a pretty cascade till at length we came upon a little tarn or upland lake of clear blue water. It was hemmed in by a broken shore made irregular by ridges partly covered with spruce trees. The views across the water of the mountains and glaciers on the west side of the valley were unusually fine. I had carried up my eleven by fourteen camera and immediately began a search for good compositions. The day was not propitious as the sky was perfectly clear and for such scenes it is necessary to have clouds and cloud shadows, but I was looking forward to another day. We went back to camp, but hardly had we arrived there before the sky became flecked with cumulus clouds and I rushed back, making a breathless ascent and reached my camera just in time to take a lovely effect of cloud shadows and calm water, which was never again repeated while we were in that region. Thirty seconds later and I should have lost what turned out to be an unusual photograph. We named this beautiful sheet of water Lake Gwendolyn (see Frontispiece) and the two larger lakes now visible across the valley Lakes "Donald" and "Alfred" after Mr. Castle's children.

We decided to remain a day or two longer in order to explore more thoroughly the surrounding region. Together or separately we visited one of the lakes across the valley, and the foot of the Bonnet Glacier, which creeps over a cliff with a many pointed and much crevassed lip, and supplies great torrents of muddy water to make the source of the Red Deer. Castle climbed again to Halstead Pass which we had reached from the Panther and much to our surprise Stephens rode his horse beyond it to a height of over 9000 feet. An even slope and a fine hard scree made this possible.

When we arrived at this camp we saw a goat scrambling along the cliff above us. A little later we saw a herd of fifteen or twenty on the bare slopes on the east side of the valley, but as evening came on there was a veritable gathering of the clans from all the feeding grounds so that we had difficulty in counting them. In one herd there were more than forty and in another about sixty-five. These eventually joined up and made the largest herd I have ever seen in the Rockies. They ascended to about 8500 feet and passed the night among some cliffs, coming down the next day to feed. The clouds had thickened up and a slight trace of smoke from forest fires appeared. As the last traces of twilight were fading the mountains were outlined in pale bluish gray, the nearer forests in a dull green, and over some of the clouds were linees of rose and fiery red. The whole scene was depicted in three color tones and through the bluish haze gave a wonderful impression of distance and grandeur. The question came to our minds why the artists do not abandon the stereotyped sunlight views and try to reproduce such effects of much stronger appeal.

Before closing it seems appropriate to express a few general ideas about this region. The valley is about twelve or fourteen miles long and more than three miles wide. So far as scenery is concerned, it is far more impressive than the average valley in the Canadian Rockies and has more variety of interest than many of them. Almost entirely enclosed by high and continuous mountains and yet with an imposing width, with virgin forests and unusually large glaciers and several lakes, the general impression is that of noble grandeur somewhat resembling the Yosemite, though with more variety. The beauty of the vegetation, the abundance of wild flowers and the presence of game, which was evident on every day of our visit, add to its charm. Throughout our exploration we failed to see any sign of a previous human visitor. The heavy tracks of a horse in certain kinds of ground leave an imprint that is visible for ten years or more, while the marks of a camp fire will endure longer than the average human life. We had a narrow game trail in many places, but a game trail is full of unaccountable twists and turns and takes no account of fallen trees or other obstacles that would stop a pack-horse.

The conspicuous features of the valley are the several fine lakes and the large Glacier that descends from Mt. Bonnet. The latter is about three miles long and more than a mile and a half wide, an unusual size for this range of the Rockies. A certain mystery is attached to the lakes which seem to have been overlooked till our first sight of them in 1917. The records show that Mr. Drewry climbed Mt. Bonnet in 1890, but it seems that these lakes and much of the valley itself are not visible from that point. Later on the two peaks of Mt. Douglas were climbed several times, but the Swiss guides seemed astonished that there were such lakes as we reported in that valley. Finally when we came in last year we had the greatest difficulty in locating them ourselves. It seemed appropriate to call this place the "Valley of the Hidden Lakes," which name has been accepted by the Geographic Board of Canada, as well as those suggested for the several lakes themselves.

I was much surprised and not a little disappointed to learn later that this valley had been surveyed by the Topographical Survey of Canada, but on further inquiry was informed by Mr. M. P. Bridgland, who did the work, that he had never entered the valley, but that the survey had been "made from peaks at the head of the Panther and Cascade Rivers." It is truly remarkable that such a fine bit of scenery as is to be found here has remained so little known to this late date. One marvels even more at the fact that the very heart of the valley may be reached in two days' march from one of the largest summer resorts of the Canadian Pacific Railway. In fact, an active horseman could make it in one day by a forced march. A trail could easily be cut through from the Red Deer River to the end of Douglas Lake and at small cost. For those who wish to visit this region in the meantime, the easiest way would be to ford the Red Deer about a mile below where the McConnell stream comes in and then work east and south till Douglas Lake is reached, after which there is no difficulty.

AT THE FOOT OF THE CRNAGORAS.*

DREW PEARSON.

The Serbian train crawled up the Katchanik mountain pass and emerged out upon the wind-swept expanse of Kossovo plain. It grunted, groaned, coughed, wheezed—and stopped. It waited five minutes while the fireman pulled clinkers out of his fire box, and until the steam-gauge registered a few more pounds of pressure. Then with a mighty effort, it crawled on.

The peasant woman next to me gave suck to her fretful babe and crooned an old Serbian lullaby:

"Şpavai spavai laku noitch,
Bog te beu opomoitch."

She was anxious to get home, but she did not complain about the slow-moving train.

The trapper who had been down to Salonika selling fox-skins, said that if the train did not get in before night, he would have to sleep in Mitrovitza, because the road to his village was a bad one for bandits on a dark night. But he was quite calm and not in the least put out because the train was late.

In fact I was the only person in the compartment who took our delay in other than a stoic fashion. I was cursing inwardly. I suppose I might have cursed outwardly if anyone could have understood me. Once to prove how slow the train was moving I got out and walked beside it. The man who had loaned me his water jug seemed quite concerned at my inability to control my feelings. He tried to quiet me by pointing out the crimson poppies on Kossovo plain. The poppies, he said, were blood flowers which had grown ever since the great battle in 1389. And then with some little pride he told me how, all alone, the Serbs had fought to protect Christendom from the Turkish invasion; and how finally they had fallen before the Turks on this very plain, after which the Turks had captured the entire Balkans and pushed on to the gates of Vienna. Yes, he concluded, much blood had flowed on that day; so much that the few remaining Serbs had had to swim their horses from the plain.

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* Where Serbia and Albania and Montenegro meet.

I listened politely, and then fell to worrying again. I really felt that I was entitled to worry. In the first place I was an American, and Americans always have and always will worry about train delays. In the second place I was going home—that is, to my Serbian home. I was going back to Péc—Péc, that city tucked away at the foot of the Crnagora mountains where Serbia, Albania, and Montenegro meet, and which has inherited all the trouble and hatred and jealousy and racial strife of the three countries that claim and fight for it. I was going back. I had been away for months and it seemed like years.

Then as the train hit the down grade of Kossovo plain, we gathered speed, and in another hour arrived in Mitrovitza almost on time. Jivan met me at the station with the Ford, and in five minutes we had left the cobblestones of Mitrovitza and were among the brown hills on our fifty mile drive to Péc.

How different from my first trip! That had been a year ago. I had spent the night in Mitrovitza and had got up early to take a Turkish kola—or carriage—over the mountains. But my kola driver had heard that the comitadjii were fighting on the Péc road, and being a Serb and a Christian, while the comitadjii were Albanian and Mohammedan, he had flatly refused, as he expressed it, to commit suicide. That, I remember, was the first time I had heard the word comitadjii—a word which had become a fearsome one in my community. The comitadjii, I had since learned, were self-appointed members of a "committee" whose function was to keep the Serbian government in hot water by robbing the mails, shooting unreasonably rich merchants, appropriating the cattle and burning the hay stacks of unamenable government officials.

In vain I had appealed to the Prefect, and the Military Commandant, each of whom were charmed, flattered and overwhelmed with my presence in their district, served me with delicious Turkish coffee, and were politely powerless to secure me a carriage. The Commandant had suggested that I wait a week while he sent a batallion to clean up the road, after which he would be only too glad to escort me in person to Péc.

Finally an Albanian kola driver had volunteered. He had little to fear from comitadjii who were of his own race and religion. The trip had taken me two days. Today I should make Péc in three hours.

"PASSERS-BY COULD SELECT THEIR BREAD FROM THE HOT SAVORY STACKS".

"WHO WOULD HAVE THOUGHT TO FASHION POTS AND PANS OUT OF STANDARD OIL TINS?"

"SLABS OF GOAT AND BUFFALO CHEESE WERE HEAPED UPON THE TABLES".

from that day, I had become and remained a skeptic on the subject of comitadjii attacks.

At Rokush we passed the stockade where I had spent the night on my first trip. The gun-holes in the thick mud and stone wall and the sharp spikes around the top, looked just as foreboding as on the night I had enjoyed its safety. But the wolf-dog in the barbed-wire entanglement outside knew me now, and did not bark as fiercely as on that night a year ago.

I knew every turn in the road, every bump, every grade where it was necessary to shift gears. And nothing had changed. Jivan made the same shifts as I had them many times before.

But as we came down from the mountain out upon the great plain—the shuma—which stretches the last 18 kilometers to Péc, I did note a change. I had first crossed that plain at 3.30 one icy moonlit morning in January. I was considered a fool for doing it. For no one ventured upon the shuma after dark. It was the proverbial stamping-ground of the comitadjii. Even the gendarmes who were stationed in block houses along the road and supposed to guard it day and night, locked themselves behind massive oaken doors after sundown. And on that first trip, I had heard or seen not a living soul. Not a light disturbed the moonlight of the shuma, not even the crack of a rifle broke its stillness; only the steady crunch crunch of my carriage wheels in the frozen mud—and once the howl of a wolf. That was all.

But on this evening—how different! A score of white-washed, red-roofed houses had sprung up from the underbrush. A hundred other houses appeared at various stages of construction. In front of them peasant women spent the last waning hour of twilight clearing away roots and stumps, the last vestiges of the underbrush which once had held sole claim to that stretch of lonely plain. Children played beside the road. The smell of fresh roast pig floated out from an open door. Men were coming home from the fields. One of them waved his hat and shouted, "Zhivala Amerika."

When I had left a few months before, the first foundation of the first house was being laid. Officials in Péc had scoffed: "What are these Americans doing? Who will live out on the shuma? Not even the refugees. They would rather die of typhus in the city, than be murdered by the comitadjii the first night in their new houses."

But now the shuma had awakened. A man had cried, "Long live America." A baby wailed, a mother began to croon a monotonous lullaby, a dog barked, a rooster crowed. And a few months before I had seen no sign of human life, heard no sound but the crunch crunch of my kola wheels in the frozen mud—and once the howl of a wolf.

A mile beyond, the automobile topped the last low ridge, and below at the very edge of the shuma lay Péc. It nestled in a cleft at the foot of the towering snow capped mountains of Crnagora, where the Bisteritza tumbled down a rift between two peaks and ran out in a silver thread upon the brown plain. Its red house-tops were half concealed under a haze of smoke which seeped out from the roof tiles; for in Péc, houses are without chimneys. And too indolent to rise, the smoke mingled with the shadow of the mountains to throw a blanket of evening dusk over the city; so that the minarets alone stood gleaming as if out of a cloud of incense. And with them silhouetted in lines beside the river were the poplar trees, which the Turks say "Talk with God." But above the shadowy city the sun was just touching the mountain peaks with its last caress. And the snow and ice reflected that caress and passed it on to the clouds above until they were flushed and flaming with crimson and gold.

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Péc awoke early on market-day. Even before the blatant Amerikanski rising gong—for Americans never feel properly civilized unless they regulate their lives by bells and whistles and time-clocks—had jarred the oriental quiet of Péc, the villagers were crowding the market place. They had driven their loaded ox-kolas in from Deciny and Istok and Rokush and Novo Sela—villages dotted over the plain 15 to 20 kilometers away. Péc people, however, measured distance not in kilometers but in hours: so that a peasant living in Deciny, four hours away, must have started at three that morning to have reached the market by seven. And the woodsmen who carried lumber on their shoulders five hours down the trail from Montenegro, must have started the day before the market.

By eight o'clock, however, ox-kolas full of yellow pumpkins, and wheat and corn and hay, and apples; and donkeys with charcoal or kindling wood, or planks strapped to their backs had so packed the narrow streets of Péc, that when the Amerikanski automobiles started to work, the market was all-a-panic. Donkeys kicked their heels in the air and their loads into the street. Oxen rolled their eyes once and then bolted—usùally into the wheels of the neighboring kola, resulting in a most untangleable tangle. Sometimes they bolted into an open shop. Fortunately Péc shops had no glass show windows. The worst part of it all was, that when the market had just begun to breathe normally after the passing of the first Ford, there rumbled into its midst a three-ton truck, followed five minutes later by an ambulance, then a two-ton truck, and finally a "malle." The latter probably wrought greatest havoc, even though it was only the "little one"—the motorcycle.

However, aside from the rush caused by those inconsiderate Amerikanskis and their dreadful gas kolas, Péc market took its own sweet time to transact business. The morning after my return, I watched Captain Bohn, the Quartermaster, from the barracks on the hill, buy wheat. He was laying in the winter's bread supply for his battalion, and he was buying against the Amerikanski ekonom who had to purchase enough wheat to feed 300 Montenegrin refugees throughout the winter. But the captain did his buying as if he were providing his wife with her weekly flour. He sauntered leisurely between the sacks of wheat which had been plumped down at random upon the cobblestones. Great goat-hair sacks they were, tediously woven by hand, with the tops open that all might see and sample the golden grain. The captain picked up a handful, made discouraging remarks about the quality, asked the price, laughed scornfully, quoted his own price, was refused, turned away, was called back, and closed the deal. And in the same leisurely wrangling manner all of Péc did its marketing.

I stopped at the cheese market to nibble. Slabs of goat and buffalo cheese were heaped high upon tables or in wooden casks. Some of it, considered especially delectable, had reached a ripe and virile age and was splatched with green mould. What a feast for the flies!

Then through the crowd I plunged and past a myriad of bazaars crammed full of things which clamored and shouted to be bought—cartridge belts, gold-embroidered; pocketbooks, flaming orange; Turkish slippers of crimson; strips of hide from which one could fashion a pair of native sandals—and jewelry, such jewelry!—

silver ropes, heavy and hand-beaten; breast ornaments of coins from every Balkan country; knives and revolvers, jewel-studded.

A department store flaunted everything from whiskey to ladies' facial massage cream. It boasted not only lemons and shoe laces, and sour milk and stockings, but Gillette safety razors, and Colgate's tooth paste, and Carnation canned milk, and Libby's bully beef, and ZuZu ginger snaps, and in the very centre of the window —a Corona typewriter.

But the most interesting place of all was the clothes market. Aged Albanian women squatted upon the cobblestones. Albanian husbands, of course, will not send their young wives to market; and these women were so aged and wrinkled that I could not but smile at their vanity in clutching their veils so tightly over their faces. Their laps were heaped with stuff, and the mud walls behind were festooned with goat-hair rugs and gaudy bed-spreads and dainty cradle covers, and embroidered towels and fascinating stockings—all colors, all designs.

And the handiwork! Some so close and fine; some so crude that in its crudeness was a charm. Some with colors beautifully matched; some with colors that fairly shouted;—with such staring impudence did they shout that I was honestly amused and laughed out of the sheer joy of the thing.

Do you wonder that I was greedy, that I passed from woman to woman, feeling, coveting and haggling?

Such a scene it was! The venders, the buyers, the races! Here buying wool was a Montenegrin with his brilliant waistcoat and little round cap set jauntily over one ear. Here drinking "boza" was an Albanian in a white wool suit which matched the snow of his mountains. Pushing a hand cart through the crowd, came a pair of yelling gypsies, ragged, picturesque. A red fezzed Turk sat in his shop, cross legged, smoking, oblivious to the babbling crowd around him. Two Serbian women in Turkish trouserettes and purple robes trimmed with fox fur, were decked out in the gala dress of a wedding or feast day. Three thick set Montenegrin women had their black hair twisted into great greasy rolls, and nursed their babies as they walked. What a mixture of wealth and poverty, of religion and races!

It was the same Péc, the same market—nothing had changed. At the corner by the lemonade shop squatted the veiled lady with whom I had stopped to haggle on a dozen different market days for a piece of sky blue silk. She had asked 300 dinars; I had pointed to a tiny wine spot and offered 200. Today the sky blue silk still lay in her lap unsold. We compromised at 250 and I went my way fairly bursting with the pride of possession.

How unique these shops! How different they were from the conventional stores of north Europe. Whoever would have thought of hanging meat out in the street? Yet that is what the Albanian butchers did, regardless of heat or dust or flies. All the dogs of Péc blessed them, and gathered to see each townsman buy his meat. Or who would have thought to fashion pots and pans and lanterns out of Standard Oil tins? Or who would have thought to build a bakery so that the oven opened out upon the street, and passersby could select their bread from the savory hot stacks?

I looked up from the crowded streets to the latticed window of a Turkish house. Oh, the fascination of that latticed window! What intrigue, what governmental plots, what harem gossip must have taken place behind it! Once I had gone behind one of those high mud walls, behind the latticed window, into the Turkish garden. There I had met a Mohammedan woman. She was the wife of Nejib Beg, the Mayor. Nejib Beg was an Albanian and a politician. He was the most redoubtable politician I ever knew; for he had been Mayor of Péc during the Turkish regime, the Montenegrin period, the Austrian occupation and the Jugoslav rule. As a sop to both racial groups he had taken two wives—one Albanian, one Montenegrin. I had met the Albanian wife, but our meeting had not been a great conversational success, because she spoke no Serbian and I spoke no Albanian. She had done a very radical thing for a Mohammedan woman—she had allowed me to see her face.

As I looked up at the latticed window, a pair of black eyes appeared behind it, looked down, and then vanished. Or was it my imagination?

In a doorway below, Mohammedan girls were playing an Oriental version of hop, skip and jump. Their quaint Turkish trouserettes flapped in the wind and their wooden sandals rang out upon the cobblestones. In a year or two they would be thirteen or fourteen and of marriageable age. Then they would become betrothed to a man whom they had never seen. They would be married and given a three-day trial during which they would have to please their husbands' every whim or be cast aside, soiled, unfit for future marriage. They would bear children, and grow fat, and waddle to the mosque every Friday, holding their veils so tightly against their faces that their noses become permanently bent to the right. They would sleep with closed windows beside charcoal brassiers, which give off carbon dioxide and tuberculosis. And at thirty they would be kept by their husbands only as one keeps an aged faithful horse. They would peer down from their latticed windows at the next generation, from which their husbands were preparing to select new wives, but which now clattered over the cobblestones in its last year of joyous, youthful freedom, unconscious of the harem prison which waited above.

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As luck would have it, the day following my return to Péc was St. Andrew's day and King Peter's slava day, and by far the most important—my birthday. The people of Péc paid homage to St. Andrew and King Peter at Deciny monastery; and not caring to celebrate my own "rojivdan" in solitude, I joined the pilgrimage which straggled down the mountain road 18 kilometers to Deciny.

The monastery stood in a cleft which the Deciny river had hewn out between the mountains. Its silver dome was set against a white and green background of snow and pine on the steep moutain side. Built by Czar Stephan in 1330, it remained a staunch memorial of the great Slavic empire, of which it once had been the capital. It fell to the Turks after the battle of Kossovo, and the story goes that the Turks were about to destroy it, when a bolt of lightning descended from the heavens and set fire to their supplies; and they had retreated in terror before the wrathful warning of Allah. So the monastry had remained undefiled through the 500 years of Turkish rule, until the Austrian occupation. The Austrians, hard pressed for metal, had sent a man to take the silver and zinc from the dome. But as he climbed, a stone gargoyle had fallen and struck him to the earth. So once more Deciny was saved.

And certainly the monastery had remained beautiful throughout the centuries. As we crowded into it, the wall paintings dimly lit by candles, glowed in colors so bright that they might have been painted just yesterday. There were purple and crimson robes and golden halos. Gorgeous gilded carvings adorned the altar. To the left under emerald silk, lay the tomb and mummied body of Czar

Stephan. Ailing peasants came and kissed his mummied hand, believing they would be cured. Priests behind the altar robed in gold and silver chanted ancient Slavic. The Natchelnik stood with great dignity on his private carpet in front. All the rest of us remained in the long stone corridor behind.

In the middle of the service, came a clattering of many feet upon the stone floor, and a host of little children trooped down the long corridor. And the crowd gave way before the little children—even the proud Natchelnik left his private carpet—and they came to the front where they stood as still and silent as if they understood every word.

For a moment as we knelt in prayer, only the noisy jackdaws in the shadowy rafters broke the stillness of the crowd. Then the guns boomed out and shook the monastery in a military salute—21 rounds. We could see the shells bursting all around us on the mountain sides.

Afterwards I went with the Pope high up in the monastery to his cloistered room, where he talked long and drank much rakija. The Pope had a weakness for rakija; especially strong rakija. His rakija had a reputation all over the plain for its strength. Once in lighting one of our gasoline lamps we had run out of wood alcohol and had burnt the Pope's rakija instead.

On that afternoon the Pope was most genial and therefore most talkative. He told many tales. He told of the Serbian retreat. It was in the winter of 1915 when the Serbs had been pushed back, and back and back.

They had passed his monastery. He had covered the floors with fresh straw. The women and children had slept there; but only part of them; for there was not room. Some had lain with the men on the frozen mud beneath the ox kolas. And some were still lying there when the others moved on in the morning.

Finally at Péc they could move no further. The Germans were on one side, the Bulgars on the other, the Austrians before them, and behind them that great black mass of snow capped mountains. The enemy had offered flattering terms, but rather than surrender, the Serbs had faced those mountains. They had blown up their guns; they had raced their automobiles up the last stretch of road, over the edge of the cliff to crash in pieces below. No automobiles nor artillery were left for the enemy. And up that narrow trail to Montenegro marched an entire nation—King, Parliament, Army, people—with little food and no blankets. One hundred and fifty thousand had died on that retreat!

The Pope fell silent, brooding.

Yes, Péc had played a great part in the war. There came a day three years later, when Péc was delivered from the hands of the enemy. Kosto Petchanatz was the deliverer. Just before the armistice, when the backbone of the Austrian army had caved in, Kosto advanced upon Péc. His army boasted but seven men. But as he advanced he gathered a score of Montenegrin peasants with their hoes and their pitchforks, and hid them in the underbrush above the road. Their tools protruded, camouflaged as rifles. Then Kosto sent a letter to the Austrian commander in Péc, demanding an immediate surrender. The commander came out to interview this head of the Serbian comitadjii, and seeing many men in the bushes believed a great army to be there. He agreed to evacuate, but asked that he might go back into the Montenegrin mountains.

"No," said Kosto, "I have another large army there, and they will be sure to take you."

So the Austrians withdrew, leaving all firearms; and Kosto entered with his seven men. But two days later, 500 Albanians swept down from the mountains and claimed the town. Kosto escaped and went to Mitrovitza by night. The Serbian army had just arrived from Salonika and it marched to Péc and retook the town from the Albanians.

The Pope was getting drowsy—he would nap before evening mass—I had to be going anyway.

I drove back to Péc in the gathering dusk. Presently the full moon shone forth and turned the road into a ribbon of light. I topped the last ridge above Péc and stopped. The sight below would not let me go on.

How peacefully the city slumbered! It nestled in the arms of those stern protecting mountains, whose snow-capped peaks towered up into the moonlight until their reflected radiance seemed to vie with the moon in lighting up the plain.

The minarets gleamed silver white over the dark house-tops, and the towering poplars cast feathery shadows upon the city. The Bisteritza, which tumbled down from the mountain cleft and splashed along the streets, wound out in a shimmering thread upon the plain.

Gone were the hum and bustle of the market. Only from the minaret tops came the wail of the hodgas—the call to evening prayer. No other sound. All was in harmony with the hills and the plains and the moonlight.

But as I listened deeply, there came an undertone of passion, a rumbling of hatred, a murmur of misunderstanding. Were not those very mountains, so magnificent in moonlight, teeming with Albanians—men whose hands were raised against every Serb? Ah yes! Though the moon softened the city with a film of magic light, there was beneath those gleaming minarets and silhouetted poplars more than quaint red-tile roofs and twisting cobblestone lanes.

Romance was there.

Race and religious hatred was there.

And passion as deep and violent as any in all the East.

THE SCENERY OF AMERICAN RIVERS.*

HEILPRIN MEMORIAL LECTURE.

DOUGLAS JOHNSON.

When your distinguished President honored me with the request that I address you on this occasion, I found myself in some embarrassment. It might seem most appropriate that I should speak on some phase of the application of physical geography to military science, to which I have given much attention in recent years. But added to the fact that I have already addressed this Society more than once upon this subject and should therefore scarcely venture to try your patience by yet another discussion of military geography, is the further fact that most of us are perhaps eager to turn our faces from the war and all it stood for, toward a new order of things. It has occurred to me, therefore, that I might better ask your attention tonight to another and more esthetic application of the science of physical geography, to which I turn my own thoughts more and more frequently. This is the *scientific study of scenery.*

The man who toils painfully up a rugged mountain side hour after hour, is well repaid when at last he stands upon the summit and sweeps the vast panorama which spreads before his vision. The craggy ridges about him and the valleys far beneath, naked precipices projecting like gaunt skeletons from mountain sides rising through a mantle of dark green forest, blue sky above and silver lake and stream below—all these he can see and enjoy. Yet how unspeakably poor is this man if he can do nothing more than tell the hills from the valleys, the sky from the plain, and vaguely admire meaningless forms and pleasing color values. Ridges and precipice speak eloquently of those mighty forces which through vast ages tortured the earth's crust into fantastic structures to form the lofty mountain range. River and valley tell of epochs of erosion which carved the mountain structure into labyrinths of ridges and ravines, according to laws infinitely more systematic and unchanging than those of Medes and Persians. Lake and waterfall bear witness to icy fingers of glaciers which cut deep into the sculptured mass, then vanished millenniums ago. A certain curve in the valley profile, a peculiar slope in hill or ridge, a sudden change in a river's gradient, these and a hundred other details invisible to the uninitiated, reveal to the scientific student of scenery a new world of majesty and beauty, and add ten fold to his enjoyment of Nature's handiwork.

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* The address, illustrated by colored lantern views, was delivered without manuscript. The following pages present an abstract of the speaker's discussion. Preceding the lecture Professor Johnson was awarded the Elisha Kent Kane medal. The presentation remarks by President H. G. Bryant are given under "Activities of the Society."

One of the most striking advances made by geographical science in the last few decades has been in the field of interpreting the origin of the earth's surface features. The theory of the evolution of landforms, first systematically applied in physical geography less than forty years ago, has been as fruitful in its more limited field as has the theory of organic evolution in its wider domain. Today we no longer look upon the yawning chasm of the Grand Canyon of the Colorado, or the majestic peaks of the Himalayas, as sporadic freaks of nature unrelated to other scenic features. On the contrary we see in them temporary phases of a continuous and systematic evolution of the earth's ever-changing surface, knowing that they have evolved from very different forms in the past, and must alter as profoundly in the future.

If we take the scenery of rivers as an example of land-form evolution, we find it possible to assign all the varied types of river scenery to appropriate stages in the life history of a river. Lakes and marshes, rapids and waterfalls, wild gorges and picturesque canyons, are among the elements characteristic of a river's youth. But soon the lakes and marshes are filled or drained, and the rapids and waterfalls are cut back to a gentle, even gradient. Still later the narrow canyons are broadened out, and we see the mature stream flowing more smoothly through silt, sands and gravels it has itself deposited on the valley floor. Valley widening continues, until in late maturity the stream swings lazily in serpentine meanders over a flat flood-plain of vast extent. Old age will find the river more sluggish than ever, unless some accident intervenes to cut short the cycle of river development before it reaches its completion.

With the foregoing principles of river evolution in mind, and fortified by numerous illustrations of typical river scenery in every stage of development, it is possible for us to examine with both pleasure and profit some of the rivers of America, to discover what phases of evolution they have passed through, and what accidents have happened to them.

The Niagara is an especially interesting example of a young river which was born near the close of the glacial period, and which had remarkable falls, higher than those of today, near the present site of Lewiston. In the process of backward cutting the falls have already retreated seven miles southward, to their present position, and are still wearing back at the rate of several feet a year. The geologist uses the rate of retreat as a measure for post-glacial erosion, and thus makes of Niagara River a geological clock. In time the falls will be completely eliminated, the valley widened out, and the Niagara River of the future will be far less picturesque than the river as we now know it. Another cataract born of the glacial period, is the Grand Falls of Labrador, explored many years ago by the President of this Society, who was the first white man to penetrate into the wild gorge below the Falls.

The Mississippi below the mouth of the Ohio shows the characteristic scenery of a late mature river. The monotonous expanse of floodplain seems absolutely level over broad areas, and neither the sluggish river nor its tame surroundings appeal strongly to the imagination. Yet the valley floor is not level, and the behavior of the stream not without interest. The Yazoo River is only a few miles from the Mississippi channel where it first enters the valley, but it flows more than 150 miles southward, to Vicksburg, before it can get into the larger stream, because the Mississippi has raised itself by its own deposits until its surface is higher than the land on either side. A flood in the Mississippi valley may not entirely pass down the *river*, but may in large part actually cross the river once or twice on its way to the sea, in order to follow the lower land of the back swamps.

The Hudson is a drowned river. The broad sheet of water, washing the base of the steep Palisades and giving to the gorge through the highlands an added element of beauty, is not the current of the river, but a bay of the ocean. The river itself was a small stream, but in the course of ages it carved a fairly large valley. Then the land sank, or the sea level rose, and the tidal waters flowed far inland, giving us a long, narrow arm of sea reaching to Albany. Outflowing land waters keep the upper part of this bay fresh, but the tides are noticeable to Albany and beyond.

The remarkable scenery of the Yosemite is due to another kind of accident in the life history of a river. This time a glacier invaded the valley, and profoundly changed its shape, cutting downward 2000 feet or more into the solid granite, and, after the ice had melted away, leaving tributary streams to cataract downward from hanging side valleys to reach the new level of the main stream. The wonderful valleys of the Glacier National Park, with their picturesque lakes and waterfalls, likewise owe their scenic value to the accident of glaciation.

In the Grand Canyon of the Yellowstone River the geographer reads the history of a romantic case of stream piracy. Yellowstone Lake formerly emptied into the Snake and Columbia Rivers, and thus into the Pacific Ocean. Today its waters reach the Atlantic through the Yellowstone, Missouri, and Mississippi Rivers. The change took place when the Yellowstone branch of the Missouri gnawed back into the Yellowstone Park plateau, cutting into the lake from a lower level than the Snake River outlet, and thus capturing the lake drainage. The new and greater volume of water, pouring down what was at first a mere headwater ravine of the Yellowstone, soon carved the magnificient canyon which now delights the eye of every visitor. When seen from the heights of Mount Washburn, the contrast between the relatively even surface of the Yellowstone Park plateau with its dark green mantle of pine forest, and the glaringly fresh walls of the sharply incised canyon, is extremely striking. Because the lava layers forming the plateau have been deeply decomposed, in part no doubt because of the uprising solutions and vapors of which we see evidence in the hot springs and geysers, the rocks exposed in the canyon walls are brightly and variously tinted, and the remarkable color effects add greatly to the scenic beauty of this example of a young valley.

The Grand Canyon of the Colorado River, often wrongly interpreted in popular accounts as a gigantic fissure in the earth's crust due to some convulsion of nature, reveals to the geographer only those normal features characteristic of a river which has cut down quietly but persistently through long periods of time, until the sum total of the work done staggers the mind. The scenic aspect of the canyon varies markedly with variations in the kind of rock through which the stream has cut. To the horizontal layers of alternately resistant and weak rocks forming the upper part of the geographical formation in the Arizona plateau are due the wonderful architectural forms of the so-called "temples." Looking north-eastward from Grand View Point one sees a broadly open, brightly colored portion of the Canyon, where relatively weak layers of rock in the bottom of the great chasm dip strongly toward the east, giving cliffs which incline downward to disappear beneath the river. Farther west the stream cuts into the basal crystallines, where a narrow gorge in the resistant rock has a gloomy, but more majestic type of scenery.

The Columbia River and its tributaries, draining the vast lava plateaus of Idaho, Washington and Oregon, offer some picturesque bits of scenery where the waters of the mighty streams thunder over numerous waterfalls, or rush tumultuously along the bottom of deep canyons cut in the dark, brown layers of volcanic rock piled up more than a mile in thickness. The Shoshone Falls have the savage beauty of severe, but imposing grandeur, Multnomah Falls, the more delicate beauty of a slender thread of crystal water framed in a bower of lovely trees and flowers. Weird pinnacles of lava are often seen on the banks of the Columbia along its course through the Cascade Mountains, especially where weathering along joint cracks has helped to isolate tall columns of the more resistant rock.

Across the center of the State of Washington there runs a broad, deep channel, with precipitous rocky walls of lava in places, but in which no river is now found. This is the Grand Coulee, and through it once flowed the mighty volume of the Columbia River. A glacier coming down out of the mountains to the north dammed the regular course of the river, and turned it across the plateau, where it carved the imposing valley we can now follow for more than 100 miles. When the glacier melted the river resumed its former course, leaving the freshly carved valley deserted. In the abandoned course we still see "fossil waterfalls,"—cliffs over which the water dropped hundreds of feet, and deep pools remaining where the plunging torrents excavated great basins at the foot of the falls.

Thus in turn might we pass in review those rivers of America specially noted for their scenic beauty, and find in each a confirmation of the laws of river development, or a record of some accident which interrupted the normal cycle of development. The geographers and geologists who have unravelled the histories of these various rivers, and so revealed the causes of their differing aspects, have demonstrated the important principles which it has been my desire to fix in your memories tonight.

We have journeyed through but one small field of the science of scenery. Yet the journey has, I hope, been long enough to show us some things of real significance. It has revealed to us the fact that the scientific study of scenery is not a thing mysterious and difficult, and therefore wholly reserved for the few. Most of the forms of the earth's surface are distinct enough to tell their story plainly to those who are willing to learn Nature's language. I hope I have been able to convince you that the reward for such a study is unspeakably rich. The thrill which comes when one discovers in hill contour or valley profile something enabling him to read with certainty events that transpired thousands or millions of years ago, or to predict with assurance the changing scenery of ages yet to be, is one of the most satisfying experiences the human mind can know.

And there is something in the study of scenery which touches the deeper things of man's being. One cannot contemplate the majestic laws which govern the operation of natural forces without realizing that back of and above those laws there must be some higher power, supreme and eternal. To seek to understand the laws of Nature is ennobling, for it is nothing less than seeking to understand the manifestations of Nature's Creator. The lands, like the heavens, declare the glory of God, and their sculpturing showeth His handiwork.

GEOGRAPHIC NEWS AND NOTES.

Canada's Boundaries.—"The Unguarded Boundary," an address by Ambassador John W. Davis as President of the Birmingham and Midland Institute of Great Britain for 1920, recalls the satisfactory condition of affairs respecting the boundary between the United States and Canada. The amicable settlement of this international boundary may be regarded as a great achievement in view of the length of line—5400 miles—and the variety of natural conditions encountered and the variety of conflicting claims invited thereby. These conditions are graphically sketched by Ambassador Davis in recounting the romance of the early days of the frontier and the history of the subsequent boundary negotiations beginning with the treaty of 1783 and terminating with the decision of the Alaskan tribunal in 1903.

The work of surveying, defining, and marking the boundary is nearing an end. Surveying of the southern boundary is practically completed, and the maps are being made upon which the commissioners lay down the line in its final position. In certain sections, particularly from the Lake of the Woods to Lake Superior, along Hall's Stream (a headwater stream of the Connecticut River), St. Francis River, and the line from the source of the St. Croix River to Passamaquoddy Bay, the final determination remains to be made, but it is not anticipated that any serious differences will arise. As regards the boundary between Alaska and Canada the section along the 141st meridian, that is from the Arctic Ocean to Mt. St. Elias, has been demarcated (Report and Atlas published in 1918); and the "natural" boundary from Mt. St. Elias to Cape Muzon, the southern extremity, has been laid down and agreed upon, and reports and maps are in preparation.

The Dominion, however, has a boundary question on its hands in the dispute with Newfoundland over Labrador. Since 1763, with a lapse between 1774 and 1800, Newfoundland has had jurisdiction over a portion of the "coast" of Labrador (James White: Boundary Disputes and Treaties, Toronto, 1914). The wording of the Labrador Act of 1825, which was supposed to be definitive, is obscure. All that the Act established beyond question was the short stretch of boundary due north from Blanc Sablon to the 52nd parallel. Northward, indeed, there was no immediate practical need for settlement; interest in the region was confined to the seaboard frequented by Newfoundland fishermen. Recently, however, attention has been called to the lumbering possibilities of the interior, which have been proved to be considerable, and to the possibilities of mineral resources which remain to be investigated. Development is precluded until land titles are assured, and this awaits settlement of the boundary issue. Quebec, which since 1912 has included all the remaining portion of the peninsula, claims the limitation of Newfoundland to a narrow coastal strip. Newfoundland makes claim to a considerable hinterland, including the timberlands of the Hamilton River basin. A commission is now at work on the problem (Current History, New York Times, February, 1921, pp. 264-265). It is suggested that an ultimate result of the case will be inclusion of Newfoundland in the Dominion of Canada.—*The Geographical Review,* January, 1922.

The Royal Geographical Society has awarded its medals and grants as follows: *The Founder's Medal* to Lieutenant Colonel C. K. Howard-Bury for his distinguished services in command of the Mount Everest Expedition of 1921; *The Patron's Medal* to Mr. Ernest de K. Leffingwell for his surveys and investigations on the coast of northern Alaska; *The Victoria Medal* to Mr. J. F. Baddeley for his work on the Historical Geography of Central Asia; *The Murchison Grant* to Mr. Charles Camsell for his explorations and surveys in northern Canada; *The Back Grant* to Khan Bahadur Sher Jang for his surveys on the Indian frontier; *The Cuthbert Peek Grant* to Mr. F. H. Melland for his explorations in northern Rhodesia; and *The Gill Memorial* to Mr. A. A. R. Boyce for his triangulations in the Sudan.—*Science,* April 21, 1922.

We learn from *La Géographie* for November, 1921, that an attempt to cross the Sahara with twelve motor vehicles will shortly be made. The starting point will be Tuggurt, the terminus of the Algerian railway, and the proposed route leads by Insalah, the Hogger region, and Adar of the Iforas, to Bureni on the Niger, 200 kilometers east of Timbuktu. The leader of the expedition will be Commandant Lafargue, and it will include a dozen members representing various government departments and other interests, among them being a cinema operator.

Joint Meeting of the Association of American Geographers and the American Geographical Society.—The meeting was held at the building of the American Geographical Society and the Geographers were guests of the Society. The main theme for discussion was the present and future uses of the soil. The world is constantly increasing in population and most of the lands in the Temperate Zones are taken up. It seems that unless some steps are taken to improve our present methods of cultivation, the world will soon face an acute situation in relation to food production. The present problems were discussed and solutions presented in several fine papers. A movement was inaugurated which, it is hoped, will lead to a general education in connection with this serious problem.

British Exploration in Spitsbergen in 1920.—In the July, 1921, number of the *Geographical Journal* J. M. Wordie describes the results of his work in Spitsbergen. The first few weeks of the 1920 season were spent in Prince Charles Foreland, the classic ground of Dr. Bruce's explorations. A noteworthy feature of the field work was the ascent of Mt. Monaco, 3450 feet, whence light was gained on several geological problems regarding both the central mountain group of which this peak is the loftiest member, and the island as a whole.

On July 22 the expedition left for Stor Fiord, the great waterway separating Barents and Edge Islands from the main island. The fiord is usually difficult of entry until late summer. With the commencement of the break-up of the polar pack drift, ice is carried westward past the mouth of the fiord; a portion swings in and is held there until driven out by north-easterly winds. Such were conditions in 1919, and they appear to be usual. In 1920, an abnormal year, the waters were very open, permitting visits to many points on the shores. Among the sections visited were Barents and Edge Islands where it was found that, contrary to general belief, the ice covering is of small extent, being confined to the central and eastern portions; "for the rest both islands are cut up by wide, moderately fertile valleys, which afford excellent feeding ground for the small remaining stock of reindeer."

One subject of the visit to Stor Fiord was revision of the coast line as laid down on the Admiralty Chart which is based on the observations of Nordenskiold in 1864 (the topographic results of the Russian expedition to measure an arc of meridian in 1898-1902 have never been published and presumably must be regarded as lost). The results accomplished here included elimination from the map of the "low flat island" off Whales Bay, an error traceable to the ancient Dutch charts. Depths of 91 and 75 fathoms were found on the site of the mythical island.

Following the description of the work done in Stor Fiord, Mr. Wordie makes some comments on the glaciation of Spitsbergen. Adopting the classification of R. E. Priestley in the Scott Antarctic Expedition memoir on glaciology (now in course of publication), he summarizes it thus: "Spitsbergen is covered in the higher parts by sheets of highland ice having their outlet towards the coast as valley glaciers; as a rule these end as such, but in exceptional cases piedmonts and allied ice-formations are developed. This represents the diminished stage of a much more intense glaciation, and if it is considered desirable can be called the 'Spitsbergen stage' of the glacial cycle." The great extent of former glaciation may be considered proved by the accumulated evidence of such phenomena as high-level erratics and raised beaches (steady rise in the land being correlated with steady decrease in the ice of the interior). Topographical evidence is largely lacking, for under the frigid climate rapid frost weathering and the consequent accumulation of talus tend to a speedy obliteration of glacially molded contours. The opinion is expressed that, with local advances, retreat of the glaciers has been constant since the period of the last great ice flood. At present they are in retreat with few exceptions.

On coal mining, which promises to be the dominant industry in the future of the island, Mr. Wordie quotes some recent and suggestive figures. Coal is now mined at Kings Bay, Cape Boheman, Advent Bay, Greeen Harbor, and Braganza Bay (head of Van Mijen's Bay). In 1919 some 90,000 tons were exported, and it was expected that the figure for 1921 would reach 200,000 tons. The deposits are estimated at 9,000,000,000 tons, sufficient to supply the Scandinavian and other northern markets for many years. Cost of transportation—which is at present very high—will be an important control of output.—*The Geographical Review,* April, 1922.

Peary Memorial.—On April 6th last, the thirteenth anniversary of the discovery of the North Pole—fitting honor was done to the late Admiral Robert E. Peary, U. S. N., by the dedication of a memorial to him at the Arlington National Cemetery.

The ceremonies were conducted under the auspices of the National Geographic Society, President Gilbert Grosvenor presiding. In the presence of President and Mrs. Harding and a distinguished company, appropriate addresses were made by Secretary of the Navy Edwin Denby and Assistant Secretary Colonel Theodore Roosevelt.

The severely simple and dignified memorial—carved from enduring granite—was unveiled by the explorer's daughter, Mrs. Edward Stafford. In the historic group present were: Mrs. R. E. Peary, Robert E. Peary, Jr., Captain R. A. Bartlett, and Matt Henson. Our Society was represented at the ceremony by President Henry G. Bryant and Mr. Walter D. Wilcox.

BOOK REVIEWS.

Winifred Hawkridge Dixon. *Western Hoboes.* Published by Charles Scribner's Sons. $4.00.

To all those readers who enjoy travel "by proxy," as well as to those who have gone, or hope to go, to the great West is commended this book—Western Hoboes.

It is the tale of travel by motor of two enterprising Boston girls from New Orleans to Arizona, thence over mountain routes to Colorado, Utah, the Yellowstone, Glacier Park, the Canadian Rockies, and east to Boston. Each stage of the journey contains its humorous vicissitudes, its difficulties more or less triumphantly surmounted. The description of wonderful scenery, of the journeying through Indian country unfamiliar to the ordinary traveler, make a fascinating tale. One lays down the book with the feeling that he will follow its itinerary at the earliest opportunity.

Beside the enjoyment of perusal, it may almost serve for a road map of the way for other adventurous souls, and its whimsical humor makes it a distinct addition to the literature of American travel.

HELEN TUXBURY.

William Beebe. *Edge of the Jungle.* Henry Holt & Co., New York, 1921.

The Edge of the Jungle contains a particularly fascinating description of the teeming life with which prodigal Nature has filled that portion of British Guiana, where Mr. Beebe has spent much time in investigating the habits and characteristics of ants, birds, butterflies and insects galore. Mr. Beebe's investigations of the evolution of jungle life and his classifications drawn therefrom are all presented to the reader with the charm and mystery of fiction, and in the delightful style of a prose writer who tinges scientific information with a poetic touch of word and suggestion that opens a new vista to the delighted reader.

LAURA BELL.

Douglas Wilson Johnson. *Battlefields of the World War. Western and Southern Fronts.* A study in military geography with a foreword by General Tasker H. Bliss. XXVI and 618 pages, 175 illustrations, maps, diagrams and plates. American Geographical Society—Research Series No. 3. Oxford University Press, New York, 1921. $7.00.

Following the author's earlier work, "Topography and Strategy of the War," this book continues the scientific research and presentation which characterizes the former volume with relatively more of military operations and military history.

Professor Johnson, as a major in the army and as a special observer for the Department of State, was able to get in touch with the highest sources of information and to make personal visits to the great battlefields of the western and southern fronts during and after the great war. This has enabled him to give a personal touch to his physiographic and military descriptions seldom found in a book which covers so large a territory and so many widely separated operations.

The arrangement of the book is unique in that following a chapter which deals with physiographic and general description is found a chapter which covers the military operations of that region.

The titles of a few chapters show the scope and arrangement of the book and are as follows:

I. The Battlefield of Flanders: The Wet Clay Plain Battlefield.
II. Military Operations on the Battlefield of Flanders.
III. The Battlefield of the Somme: The Dry Chalk Plain Battlefield.
IV. Military Operations on the Battlefield of the Somme.
V. The Battlefield of the Marne: The Plateau-and-Lowland Battlefield.
VI. Military Operations on the Battlefield of the Marne.

Similar titles are used for descriptions and operations in relation to Verdun, Lorraine, the Trentino, the Isonzo, and the Balkans.

The book is written in such a manner as to be attractive to the geographer, the general reader, and the military student. One might expect such a work to be dry and uninteresting, but many of the descriptions are so gripping that a chapter once started is sure to be finished before laying the book down. The description of the mud of Flanders is especially strong. "Assaulting columns found it difficult to scramble out of the slippery trenches and were mowed down by enemy fire as they advanced slowly through a tenacious clay into which they sank more than ankle deep. Rifles became so clogged that they could not be fired; * * * The wounded lay half buried in the mud, and many were suffocated. Even the well and strong were caught in fatal mud traps. * * * The author has visited the fighting fronts from the sand dunes of the Belgian coast to the entrenched camp of Saloniki and observed during the conflict the conditions under which men fought from the polders below sea level to the glacier-clad heights of the Alps. He has no hesitation in saying that, of all the combatants, those who fought on the plain of Flanders endured the most terrible physical conditions."

The pictures and most of the illustrations are good and well chosen, but the maps which are contained in the pocket are very difficult to read and discouraging to one who does not have access to other maps. This, however, is but an insignificant drawback when compared with the excellent qualities of the book as a whole.

F. E. WILLIAMS.

Lieut.-Col. C. K. Howard-Bury, D.S.O. and Other Members of the Mount Everest Expedition. *Mount Everest. The Reconnaissance, 1921.* Longmans, Green & Co., New York, 1922.

A whole book about the Top of the World! Here indeed is adventure, and the quest for the highest mountain on earth, recorded in graphic manner. Mount Everest is at least taken out of a mysterious void, which it so long occupied in old maps of the Nepalese-Tibetan frontier, and is placed before us accurately, making one feel that if the great peak should loom up in the distance of some great panorama, we too might recognize it and feel the thrill of its magnificence. To be sure, there is no story of actual conquest—reconnaissance and not climbing was the primary object of the 1921 Expedition—but we have given to us the results of painstaking work, the first great piece of exploration since the war, opening to us vistas of far lands, strange people, great glaciers and gigantic summits. The spirit of adventure is inherent in nearly every one of us, and, although the opportunity to wander into the distant places is given only to a few, a book such as the present one serves a great purpose in keeping alive that spirit, which is perhaps life's finest gift.

The book is opened by an introduction from Sir Francis Younghusband, President of the Royal Geographical Society, followed by the narrative of the expedition, written by Col. Howard-Bury, leader of the reconnaissance. Mr. Leigh-Mallory describes with singular effectiveness the difficulties and obstacles, overcome by efforts almost superhuman and leading to the discovery of an apparently feasible route to the summit of Mt. Everest. To the experienced climber who knows the Canadian or Continental Alps, thoughts of strenuous mountaineering above 20,000 feet cannot fail to arouse a feeling of awe; the realization that an altitude of 23,000 feet was actually attained on Mt. Everest itself, surely commands the admiration of all. Mr. Wollaston, naturalist to the expedition, describes in interesting fashion the remarkable flora and fauna encountered in Tibet, and the curious religious beliefs against the taking of life, which, while hindering the collector, result in a marvelous tameness of the wild creatures. Finally, we have an appreciation of the work of the expedition by Prof. Norman Collie, President of the Alpine Club, and a series of appendices dealing with the survey work, geological results and scientific equipment.

A series of thirty-three plates visualizes the grandeur of Mount Everest and its surroundings, while the maps reveal for the first time the topography of a vast and previously unexplored area. The large scale map—1 : 100,000—of the Everest massif will prove useful as a means of following the route of the climbing parties in 1922 and indicates the progress of the reconnaissance parties during 1921.

"To do some new thing beyond anything that has been previously accomplished, and not to be dominated by his environment, has made man what he is, and has raised him above the beasts. He always has been seeking new worlds to conquer. He has penetrated into the forbidden ice-worlds at the two poles, and many are the secrets he has wrested from Nature. There remains yet the hightest spot on the world's surface. No doubt he will win there also, and in the winning will add one more victory over the guarded secrets of things as they are."

J. Monroe Thorington.

William H. Babcock. *Legendary Islands of the Atlantic.* A Study in Medieval Geography; (American Geographical Series No. 8), American Geographical Society, New York, 1922. 196 pp.

Deep-sea navigation goes back into antiquity. Sea-roving beyond the Pillars of Hercules has served as a basis for much of the legends of the Mediterranean peoples, and the sagas of the Norseman abound with illusory references to islands in that vale of mystery to the west. In this book there is presented a scientific treatment of early navigation at long range in the Atlantic with its marked influences not only on folk lore and myth, but on the later voyages that resulted in the recorded explorations of the thirteenth, fourteenth, fifteenth and sixteenth centuries. Supported by fragmentary evidence and a rather unique collection of contemporary data, Mr. Babcock has developed a truly interesting story of pre-Columbian explorers.

The origin of Plato's narrative of Atlantis and its connection with the Sargasso Sea; the identification of the Island of Brazil, familiar in Norse and Irish legends, with the region around the Gulf of St. Lawrence; and the division of the Vikings' discoveries in America into three districts, Helluland, Markland and Vinland, are a few of the many subjects treated. The author is well qualified as a student of Medieval geography, this volume being his second in this field. It is well illustrated, most of the illustrations being reproductions of medieval maps.

JOHN BRIDGEMAN.

Arthur Heming. *The Drama of the Forests.* Pp. 324. New York—Doubleday, Page & Co., 1921. Price $5.00 net.

This is a story of the Great Northern Forest that lies between Maine and Alaska. It is a narrative of Canada's northern wilds by one who has followed their trails to the end of the road and who has encamped along the way. Here is a vivid description of the life of the voyageur and trader, the Factor, the half-breed and the Indian. The author is at his best in his descriptions of the habits of the men and their prey in the north wood. The shrewd and canny Hudson Bay Factor and the improvident and leaning Indians and half-breed trappers are portrayed at their game of barter. The chapter on "Wild Animals and Men" is rich in woodlore as related by Oo-Koo-hoo, the Owl, a veteran Nimrod and a wizard in the knowledge of traps, trails, mating season, furs, calls and all deceptions and lures so useful in stalking and taking game of all sizes and all habits.

The author makes no attempt, apparently, to unite his material under a systematic and purposeful presentation, but if we follow him through we are led to the conclusion that the story of the woods is the central idea, even if given in somewhat disjointed sections.

CARL SHRODE.

Howard Palmer and J. Monroe Thorington. *A Climber's Guide to the Rocky Mountains in Canada.* 183 pages with 8 maps. $2.50. The Knickerbocker Press, New York, 1921.

This is a book of pocket size, which attempts to summarize the existing mountaineering literature which relates to the Canadian Rockies or that portion between the International Boundary and the fifty-fourth parallel.

As the volume is the first of its kind in this particular field, it should prove of value to all alpinists and travelers among the Canadian Alps. The index contains names of more than 450 peaks above 9000 feet in elevation. Locations, altitudes, literary references, data about first ascents, and climbing directions are given for these, as far as available information permits. Entirely aside from its utility in the field, the book should prove acceptable in the library as a substantially complete index to the mountaineering literature of the Canadian Rockies and to the chief maps delineating them.

F. E. WILLIAMS.

William Harman Black. *The Real Europe.* (Pocket Guide Book). Pp. 582. Maps. New York—Appeal Printing Company, 1920. Price, $3.00 net.

This guide book of convenient pocket size is written to meet the needs of the tourist who wishes to know when and where to go, how to go, how long it takes, how far it is, what to see, what not to see, etc. It is based on the new boundaries of Europe as fixed by the Peace Conference.

Its possession will save the owner time and money in arranging his itinerary and will well repay its use despite a few omissions of points of interest and of the locations of the American Express Company's offices in various cities.

L. J. SERVAIS.

Lewis R. Freeman. *Down the Columbia.* (With illustrations from photographs). Dodd, Mead & Co., New York, 1921. 383 pp.

This work represents a highly entertaining account of one of the many adventures that the author has tried in nearly every quarter of the globe. The Columbia is one of the great rivers of the world. It runs through mountainous territory for practically its entire course. It is a river of tortuous passes and seething rapids, many of the latter extending for fully twenty miles. There is very little slack water through which the voyager may leisurely ply his paddle or oar and partake fully of the charm of the region. It is a "he-river," one guide tells us. Another says that it is "as full of tricks as a box of monkeys, and you've got to keep an eye lifting for 'em all the time if you're going to steer clear of trouble."

The author traveled over this stream from glacial source to tidewater, going on record as the first man that has negotiated this daring exploit. To say daring is to put it mildly. The thrills incident to the voyage followed one upon the other while Mr. Freeman and his party were on the water.

The book recounts the day-by-day experiences of this group of hardy boatmen from the time they said good-bye to the Lake of the Hanging Glaciers until they reached the open stretches of the river near Portland. The story is written in a light and pleasing vein, the Columbia forming not only the central object of interest, but the whole theme. Consequently, one is unable to gain much of a picture of the undoubted scenic splendor of the region that might serve so well as a fitting background to the drama acted on the bosom of this majestic stream. The story itself, however, is well told and there are many fine photographs to complete the work.

JOHN BRIDGEMAN.

C. Gordon Hewitt. *The Conservation of the Wild Life of Canada.* Charles Scribner's Sons.

This book is a thorough and searching analysis of the wild life of Canada, and a plea for its immediate conservation on the basis that civilization in its true sense signifies the elimination of the spirit of tartarism and the introduction of an enlightened attitude that realizes the benefits derived from preventing useless waste and slaughter of our rapidly diminishing animal and bird friends.

The problems, therefore, confronting us involve a knowledge of the following questions: Of what does our wild life consist? What is its value? What are the factors that are responsible for its reduction and ultimate extermination? What steps are we taking to conserve it, and how can we improve on present methods with a view to conserving a valuable natural resource, the constituent parts of which cannot be replaced once they are lost? Throughout the pages of this book these problems are considered in a scientific and scholarly manner.

The approach to the problems considered can best be suggested by a selection of typical chapter headings, such as:

(1) The Value of Wild Life to the Nation.
(2) The Extermination of Wild Life.
(3) The Game Animals of Canada.
(4) The Buffalo or Bison—(Its Present, Past and Future).
(5) The Game Birds and Larger Non-Game Birds of Canada.
(6) Birds in Relation to Agriculture.
(7) The Enemies of Wild Life and the Control of Predatory Animals.
(8) Reserves for Game and Wild Life in Canada.
(9) A Review of Provincial Game Legislation.
(10) The Utilization by Domestic Action of Our Larger Native Ruminating Mammals.

HENRY F. JAMES.

Enos A. Mills. *Watched by Wild Animals.* Pp. 243, illustrated from photographs and from drawings by Will James. Garden City, N. Y., and Toronto. Doubleday, Page & Co., 1922. Price, $2.50.

Delightful descriptions of natural history and nature lead one on through the book giving an insight into the haunts and habits of the big and little, the timid and so-called treacherous animals of the plain and mountain.

Clever portrayals of the characteristics of beaver and black bear, of cony and coyote, of goat and grizzly, of mountain sheep and lion appeal to the "Fireside Enthusiast," as well as to one who has followed in their tracks, or has been followed by these creatures, whose consuming curiosity has laid some of them open to the charge of seeking to attack man.

The chapter "Introducing Mr. and Mrs. Skunk" is full of Mr. Mills' delightful and original humor and charm.

ALVINA MCCORKLE.

Vilhjalmur Stefansson. *The Friendly Arctic.* 784 pp. with illustrations and maps. The Macmillan Company, New York, 1921. $6.50.

This imposing volume recounts the experiences of the Canadian Arctic Expedition during its five years in the polar north. Sailing from Nome in July, 1913, the expedition, with three ships, complete equipment and an accomplished scientific staff—had every prospect of carrying out a well matured plan of exploring the Beaufort Sea and the unknown area north of British North America. These pages narrate how fate, in the guise of elemental forces of nature, thwarted these plans and forced the explorers to meet unforeseen conditions in carrying out their ambitious program. While the body of the work is devoted to the achievements of the commander in his pioneer sledge journeys over the sea ice, condensed summaries in the appendix relate to the work of the southern section under Dr. R. M. Anderson, and to the fortunes of the Karluk party under Capt. R. A. Bartlett. As a contribution to the literature of polar research, the book will be accepted as an exposition of a new method of arctic exploration, worked out and tested by its author to the utmost limit of human ingenuity and endurance. The keynote of this innovation in arctic travel, consists in the elimination of the prepared food of the White man and a resolute dependence on the animal resources of the country to sustain human life. Previous extended experiences of the author among the so-called Blonde Eskimo of Victoria Land in 1911, had weaned him from depending upon the traditional pemmican-hard bread diet of former explorers; so that on the present enterprise he was prepared to adopt the simpler regimen of his former native associates—reinforced by the possession of the high power rifle and the superior intelligence of the White man. The unforeseen separation of the commander from his supply ship—the Karluk—eventually forced upon him the alternative of facing defeat, or carrying out his extensive program of exploration by the "living off the country" method already referred to. How successfully he accepted the challenge, the present volume bears witness.

In the ordered sequence of the story, much space is devoted to the detailed accounts of the various sledge expeditions from 1914 to 1917, which resulted in the discovery of new lands and the acquisition of additional data relating to the extension of the continental shelf.

Although the author minimizes the hardships and dangers of his northern quest, and reduces polar sledge travel to a formula which is simplicity itself—evidence is not lacking to show that campaigning in the North still has its thrills and hazards of fortune, against which human foresight cannot prevail. It is the supreme merit of Stefansson that by his mastery of the technique of northern travel he was able to reduce these dangers to the minimum and to win success in the face of appalling difficulties.

After reading this unusual book, the question naturally arises in the reader's mind. Will future adventurers in the far north be disposed to adopt like methods in pursuing their investigations into the unknown? Some will maintain that Stefansson by temperament, training and hardihood is quite exceptional among scientific explorers. The future alone will prove whether we shall have a new breed of travellers into the unknown spaces, who will be guided by his precepts, or whether we shall live to see the aviator-explorer add the regions about the North and South Pole to his itineraries.

HENRY G. BRYANT.

ACTIVITIES OF THE SOCIETY.

HAPPY DAYS IN JAPAN

DR. WILLIAM E. HUGHES

Japan is a country that is becoming more and more prominent in world affairs. Her prominence in recent international discussions, and her rapid rise to power and influence in Far Eastern affairs has made the name of Japan a household word throughout the country. Our lack of knowledge of this island empire, the Britain of the Pacific, has led to misunderstandings of her ambitions, her penetration of the Asia mainland and her development of a great navy. Consequently the address of Dr. William E. Hughes on the evening of February 17th, 1922, was very opportune.

By the use of beautiful colored slides, and excellent descriptions, we were able to see life as it actually exists on the highways and byways of Nippon. We were also allowed frequent glimpses of some of the historic places and scenic wonders of that little known island. Dr. Hughes' familiarity with his subject, due to extensive travel throughout the length and breadth of the largest island (Nippon), gave a personal touch that made the people fortunate enough to hear him realize that the Japanese have a happy home life and practice many admirable traits.

REMARKS OF THE PRESIDENT ON CONFERRING THE ELISHA KENT KANE MEDAL ON PROFESSOR DOUGLAS W. JOHNSON—MARCH 1, 1922

Our session this evening is signalized by two events which distinguish it from the usual routine of our meetings: We shall listen to a Heilprin Memorial lecture—which commemorates in name the founder of our organization, Professor Heilprin, and we shall bestow our Elisha Kent Kane Medal, the highest distinction in the gift of the Society.

In previous years, this award has been made to prominent American and foreign explorers and scientists, as the inscription states: "For eminent geographical research."

In selecting recipients for the medal, the council has usually favored pioneer explorers, but in the two notable instances of Professor Wm. M. Davis and Dr. Ellsworth Huntington, it bestowed this distinction on eminent scholars and educators in the realm of geography.

Tonight we are returning to this commendable practice and we deem ourselves fortunate in finding in the person of Professor Douglas W. Johnson, of Columbia University, one who, by his achievements sizes up to the high standard which has governed the council in making these awards. As a student of land forms under Professor Davis at Harvard, he won the commendation of that master, and subsequently, as professor at Harvard and Columbia brought to his task enlightened methods which captured the interest of the student and helped to place the science of geography in its present high place in the educational system. But it is as a pioneer in pointing out the significance of topography as affecting the strategy of war, that Professor Johnson won special distinction in recent years. On three occasions during the war he addressed us on this favorite theme, and his conclusions on the subject have been embodied in two books: "Topography and Strategy in the War" and "Battlefields of the Great War"—works which have received the highest praise from students of military geography in Europe and America. To these contributions to geography in the fields of education and literature, Professor Johnson added his services as a member of the commission at Paris to negotiate peace, where he served as Chief of the American division on boundaries with the rank of major in the intelligence division of the A. E. F.

For all these achievements in a busy and useful career it becomes my agreeable duty in carrying out the mandate of our council to hand you the Elisha Kent Kane Medal of the Society.

THE SCENERY OF AMERICAN RIVERS—HEILPRIN MEMORIAL LECTURE

DOUGLAS W. JOHNSON

After graciously accepting the Elisha Kent Kane Medal Dr. Johnson delighted the members of the Society and their friends with a popular but scientific talk on the development and scenery of some of our American rivers. The fine illustrations taken from various parts of the United States were well chosen and made doubly clear the word description of river development. A synopsis of this excellent lecture is found in this bulletin, Page 22.

COLORADO AND THE SOUTHWEST

FRED PAYNE CLATWORTHY

The attraction for the intermonthly meeting on March 15th, was Mr. Fred Payne Clatworthy. Installed among the audience with his special lantern, the speaker entertained his hearers with running comments on the autochrome views which were projected from the screen. These covered a wide range of territory, including natural scenery of California, the grand canyon of the Colorado and views in the Rocky Mountain National Park. The lecturer, while not endowed with the finished graces of the orator, proved himself to be a master photographer and the exquisite beauty of coloring displayed in the Lumiere plates, aroused the greatest interest in the large audience present.

THE LURE OF THE GREAT NORTHWEST

FRANK BRANCH RILEY

On the evening of April 5th, the unusually large audience which gathered at Witherspoon Hall was given a rare treat. To one who has heard Mr.

Riley talk on his favoriate theme, "The Lure of the Great Northwest," it is unnecessary to add praise. It would also be almost impossible to describe his lecture to one who has never heard him. Mr. Riley is one of the cleverest speakers it has ever been our pleasure to hear, and his slides are truly beautiful and wonderful. He has traveled widely, lived in the open, and is able to make his audience share his delight in the great outdoors.

RONDONIA, IN THE BRAZILIAN WILDERNESS

HARRIET CHALMERS ADAMS

Having followed the trail used by Theodore Roosevelt in the heart of Brazil, Mrs. Adams was able to bring an instructive message to the members of the Society, who gathered on May 3rd at Witherspoon Hall. Slides and motion pictures were used to portray the daily life of the natives in this part of Brazil. Unique games as head ball; curious customs at funerals; strange dances; unusual ornaments; all were clearly shown and described. The people of this part of Brazil seem to have a rather strong "national spirit," which is somewhat unusual under the conditions in which they live.

SIR ERNEST H. SHACKLETON

Acting on behalf of the Society, Professor William E. Lingelbach sent a message of sympathy to Mrs. Shackleton. The message and Mrs. Shackleton's reply follow:

"The members of the Council have learned with profound sorrow of the death of Sir Ernest H. Shackleton on January 5th, last, while on board his steamship "The Quest," which had recently arrived off South Georgia on the threshold of the Antarctic regions.

"In common with others who were brought into personal touch with this gallant explorer, we mourn the passing of a born leader of men, who achieved much for science on his three expeditions to the Far South and endeared himself to hosts of admirers by his fine qualities of heart and mind. Seldom were the attributes of command and leadership so blended with the idealistic spirit of the knight-errant, as in him. We cherish the memory of his association with our Society as Honorary Member and Gold Medalist, and unite with his countrymen in mourning the passing from the scene of his earthly activities of one of the great heroes of Antarctic discovery."

14 Milnthorpe Road, Eastbourne, April 25th, 1922.

DEAR MR. LINGELBACH:

Please accept my heartfelt thanks for your kind sympathy and for the memorial—with its beautiful tribute to my beloved husband. I am deeply touched by this appreciation of his work and I thank the President and Council and yourself from my heart. I have such warm recollections of the kindness shown to us in Philadelphia in those happy days—now gone forever.

Mr. Henry Bryant was President in 1909 and signed the diploma which is hung on the wall close to where I am now writing. Believe me,

Yours very sincerely,
EMILY SHACKLETON.

LOCAL EXCURSIONS

MARY GRAHAM TYLER

A warm afternoon, May 6th, lured about twenty to sally forth on an excursion to the Andorra Nurseries under the able leadership of Miss Holmes. The largest number went by trolley to Chestnut Hill. A few took an independent route by automobile. A short walk through the shrubbery, then into the wooded district gave pleasure in its introduction to some choice and unusual trees. A rise of ground commanded a charming view and other knolls we ascended through the evergreens did likewise until the party broke up, some returning home and others more strenuous sauntering off on a longer stroll to Ridge Pike and back another way to the entrance of the arboretum.

One of the most attractive trips planned by our local Society materialized in a visitation on May 20th to the Naaman's Creek historic tea house, once an old Revolutionary haunt of Washington, Anthony Wayne and other characters of the period who frequented the home of the Robinsons. The present occupants of the historic mansion bear the same name, which gives and added interest.

The situation of the house is not what it once was. Though close to the Delaware River, it has been encroached upon by business enterprises and straggling civilization from larger towns nearby which gives a sordid note the still romantic brook and shaded woodland do not care to share. Remote enough though is the dear old-fashioned garden with its hardy perennials and sunny flowers. In the background are bungalows and the deserted studios of artists; in the foreground this lovely, quaint old home with its Doric columns and general air of spacious ease and hospitality.

We had lunch on the porch and lawn of the old block house, one of the few relics of that kind to escape the firebrands of the hostile Indians. It is in an excellent state of preservation, its main rooms filled with ancient bits of furniture and the prints of the family and notables once habitués there. These were entertainingly described by Mr. Charles Robinson, who is thoroughly conversant with his history and biography.

After some delightful hours, we had ice cream served in the old dining room, and then sixty strong started on the return journey to Philadelphia.

The BULLETIN of the GEOGRAPHICAL SOCIETY of PHILADELPHIA

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1922

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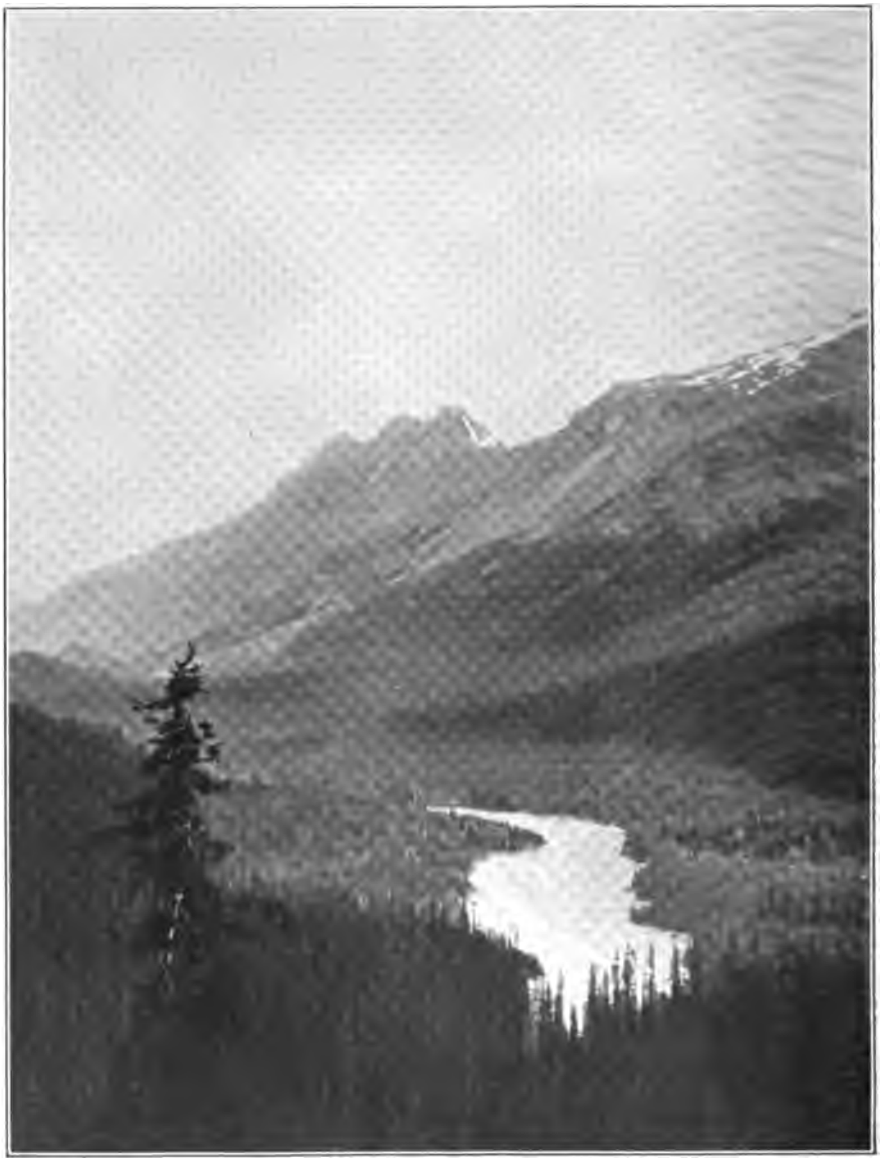

HOWSE PASS AND SOURCES OF NORTH SASKATCHEWAN RIVER

THE LAST HOUSE IN THE WORLD.[1]

FULLERTON L. WALDO.

Edmonton used to be called "the last house in the world." The name was given by those who trekked northwest on ox-carts, nine hundred miles in three months from Winnipeg, easily within the memories of men still in the prime of life. Today, by train, the distance is less than 800 miles, and the time is a little over 26 hours. Today, one thinks of Edmonton not as the last house in the world but as the first of a sub-Arctic empire, with its portal wide-flung to a domain of over a million square miles, as large as Europe from Spain to Russia, from which a Pennsylvania might be carved twenty-five times over. The province of Alberta, alone, of which Edmonton is capital, reaches from the Montana line to the north as far as Philadelphia is from Hudson Bay.

There is an English sign in a German museum which says, "The eye of the visitor on entering this room will be struck with a porcelain umbrella." The first thing that strikes your eye as you come to Edmonton (if by the Canadian Pacific) is the giant railway bridge that spans the gorge of the Saskatchewan between Strathcona, now part of the greater city, on the south bank, and the part on the north side of the river. The Canadian Pacific and the city put $1,500,000 into the bridge, when it was plain that no power on earth could call a halt on the rising tide of immigration and confine it to Strathcona where the C. P. railway terminal and the car-shops were.

Edmonton had to grow. From the long, low white shack of the Hudson's Bay trading post whose factors with their families and their dogs were the whole of the settlement it grew to a population of about 200 a third of a century ago, and now there are close upon 70,000 souls where the dogs quarreled in the traces and the "silent smoky Indian," like Matthew Arnold's Iberian, undid his corded bales.

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[1] The editor is indebted to Mr. Waldo for permission to present this chapter from his book "Down the Mackenzie," which will be published in February by MacMillan.

As I told the Rotary Club at their weekly luncheon in the Chateau MacDonald, I knew Edmonton was no one-horse city: but I was not prepared by the last Baedeker of Canada, published in 1907, for what I saw. The Chateau MacDonald itself, eleven stone stories to the peak, was a modern miracle of parquetry and tiling and plumbing, solid comfort and punctilious service. In my room were pictures—Sir Joshua's "Miss Simplicity," Madame Vigee Le Brun's portrait of self and daughter, an old French print and a modern English picture—with cretonne curtains through which to peer from the depths of a morris chair into the depths of the gorge of the Saskatchewan. The walls of this gorge are a natural parkway of poplars, in dark-green sentinel solemnity: here and there a road strikes through them from the water, or a cottage is planted. There is a golf-course on each bank—one private, the other public, and a large part of the population rises betimes to possess itself of the fairway of the public course on a holiday morning.

The river does as it wilfully pleases: it turns no wheel, and it feels no paddle. It is nearly as free as the wind or the sun. Two ancient steamers—one wrecked in the stream, one high on the bank—are the rotting visible evidence of a struggle given over to the mud-brown or soup-green current, where "eddy into eddy whirls and ripple ripple over-curls." One water-puss plays tag with the next, the pulses of the breeze send one shadow after another scurrying across the rapid, sliding intervolved current—it were better to say currents—like the wind over a wheatfield. It is risky to float a canoe or a motor-boat—the occupants may soon be crying for help or clinging to the keel of their overturned boat for the stream to pick off one by one. What is the river good for? Hydro-electric power, obviously, such as they telegraph overland by two lines at Winnipeg. But Edmonton, with 34 coal-mines in and around the city, does not now need to harness the river. In time, should the necessity arise, the river may be drawn upon as a reservoir of energy. Meanwhile, old as it is, it plays like a child, it runs like a colt, wild and foot-loose, with the sun in its face all summer long: a roaring, buffeting monster when the ice goes out in spring. Imagine how angry it is against a bridge in the way! The butting and heaving, the crashing and grinding and rending are no use against the high level bridge, with its road-way, footway, bicycle-way, two trolley-tracks and railway-track hung in space, but the low-level bridges tremble for their lives in the onset of the ice, and sometimes a mad flood dispossesses the lowlanders. To hold down one of the bridges a gravel train was put on it, and divided in the middle, an engine at each end to haul its half away if the bridge was seen to be collapsing. Houses and shacks drove against the abutments and were smashed to kindling-wood. The spirit of Edmonton rises to every such challenge, major or minor, in just such ways.

For you cannot hold back the spirit of such a people. It is not merely that the blood of the pioneer runs strong as the Saskatchewan in the veins of their descendants. The pioneers themselves are still vigorous in the tidal life of the community. You can see in the way they carry themselves that they have been at the back of the North Wind. Their faces are rosy with the flush of prairie sunsets. Their hair is white with the snows of northern winters. They stand like seasoned oak, and walk with no waste motion. They were the hewers of wood, the drawers of water, the men who did things for themselves and got what they went after, never expecting anything to be handed to them on a tray. You and I have entered into the fruit of their labors. Their steel-blue eyes are wise and kind and far-seeing: they have large and tolerant ways: and they do not tell their stories unsolicited. They leave it to the tenderfoot to brag—to tell of cold winters—to narrate his own exploits—to embroider the privations that he suffered in getting up at five or doing without steam heat, electric light and running water and French rolls. The pioneer thinks of staving off the Indians, of tending cattle in a blizzard, or running the rapids in canoe or York boat, or crossing the prairie in a Red River ox-cart where no roads were, or fighting forest fires that encircled his homestead, or nursing sick wife and children hundreds of miles from a doctor, far from a neighbor. The pioneer, who knows, thinks his own thoughts, keeps his mouth shut, and lets the young and foolish blabberer run on unrebuked. He has done his work—he knows what's what—he would not give his memories for the young man's luxuries. But the bean-headed, pasty-faced, ice-cream-hatted, toothpick-toed, movie-haunting, slang-slinging city-bred youth had better think twice ere he smiles once at the veteran. "The automobile sons of the buckboard fathers." The veteran made possible the bright lights and the tramways, the asphalt, the pile of steel on steel, and stone on stone, and all that is the city.

And what a city it is! Numbered streets cross numbered avenues, one hundred to the block, so that when you hear an address you know at once where it is and where you are. All thoroughfares are wide, with an eye to the future, put down by those who knew their city was to grow. The multiplicity of two-story houses makes for domestic content under one's own Virginia creeper and balm-of-Gilead or poplar tree, like the family happiness of an American city in which there are individual homes instead of "multiple dwellings" or teeming rookeries. The people are proud of the place, and glad to show it off: but I heard no windy boast that the facts did not justify. Ostentation and vain pretence had no part in the overwhelming inundation of their hospitality to an utter stranger. All they expected in return was the plain truth told about them: they feel that as they have shown the world how livable this part of it is, they are entitled to a hearing that is free from the poison-gas of malice, the yellow peril of sensational journalism, or the mischief of the muck-rake. Some southern folk seem to think that Edmonton is not far removed from a cluster of Eskimo igloos, or at any rate Indian tepees. The first thing that ought to be knocked into their heads is the idea Stefansson expounds and enforces in "The Friendly Arctic"—the idea that with decent care for fingers and nose a searching winter cold is no bad thing for health and is on the other hand a spur to manliness and bold initiative. When Edward Whymper was in the Andes, his Swiss guide looked at wretched natives squatting in their rags scratching their flea-bites and said, "What these people need is a winter." Progress is not with the languorous tropics, amid the atolls of the South Seas, or under the fronds of O'Brien's Tahiti. It is with the people who fear a falling barometer as little as they fear the Aurora Borealis. The superstitions about the North find it hard to live above the forty-ninth parallel. Beyond that line they encounter the people who live in the North and so prove that the North can be lived in. It will be no use to give these people books or moving pictures that falsify the facts of life they know. It stirs their laughter when they see on the films a couple of hundred Mounted Police turning out in their shirt-sleeves like firemen sliding down a pole to arrest an Indian for they know it isn't done that way.

The arm of the law often strikes from the resolute person of one man in that highly respected uniform.

Temperatures? Yes—there are temperatures. Stefansson has much to say of them, in a most illuminating way. The lowest temperature given for Fort Macpherson on the Mackenzie delta, 68° below, is the same as for northern Montana, just below the Alberta line. The lowest record for Herschel Island, last of the Royal Canadian Mounted Police posts, in Beaufort Sea in the Arctic west of the Mackenzie river-mouth, is 54° below. Stefansson in 1910 enjoyed or endured a temperature of 90° in the shade nearly every day for 6 weeks together. The maximum at Fort Yukon is 90° in the shade. This year (1922) it was 32° at Edmonton June 5, and on June 6 there was a snow-flurry. The same day showed a temperature of 96° at Winnipeg—the highest in 10 years. Next morning at Winnipeg the temperature had dropped to 50°; by noon it had returned to 61°. On the evening of June 6 it was 22° at Vegreville, Alberta, and 20° at Estevan, Saskatchewan. Corn and beans were hurt, grain did not greatly suffer. Wheat is raised at Fort Vermilion on the Peace River, some 350 miles North of Edmonton, and even at Liard, north of the 60th parallel. That parallel is accepted as about the present limit of wheat-raising, but the limit is sure to be pushed steadily northward.

In a June week at Edmonton I wanted nothing heavier than a sheet for covering when I slept, yet the nights felt cool and dry as compared with a typical summer night in Philadelphia.

The street-car lines in Edmonton scarcely require plows—little ones no higher than the wheels may be called into service two or three times in a winter. The snow does not drift in the streets as it does in eastern cities. Neither do the people—unless it is a fire or a band or a parade or some other good reason.

I visited the University of Alberta, to see its extension work. There is a group of brick buildings, finely wrought, trimmed with white stone, and at the edge of the campus are experimental fields to discover what will or will not grow in northern latitudes. The only kind of apple that survives the frost is the crab-apple, but plenty of good fruit of every sort is brought to Edmonton for sale at prices no higher than those prevailing in lower latitudes. There were many cinema reels ready to be sent to all points of the compass, and boxes of books to be given out by a circulating library worthy of the name. In the city public library last year 18,000 subscribers asked for 320,000 volumes.

The human exhibit at the University was the best. Ere the six weeks' summer session for teachers began, a school for farm children was held for a week. Some of the students had not seen a railway train before they came. They were sent by organizations at home that would look for a report from them when they returned. I saw a hundred of them abloom in the spotless white Convocation Hall listening to an illustrated lecture on French history: and after it someone recited for them Drummond's habitant poetry—to their closest attention and their unrestrained delight.

Doctor Ottewell, head of the department, spreads his ample personality all over the province with lectures. One of these was given to a Negro colony 100 miles from Edmonton. In the dim light of the single lamp, little could be seen of the audience but rows of teeth gleaming like corn-ears. The proceedings opened with the reading of a home-brewed newspaper which one of the young Negresses had herself written. This item was received with utter solemnity. "Sister Payne went to de convention ob de Saints ob God. While she was away she put her chickens in the care ob de Lawd. When she came back, dey was nearly all daid."

It is the people's university. They write to it not as to an institution but as to a person, a friend in need, to get information for a crop or a domestic problem or a debate. Academic pomp and circumstance, red tape and routine under Doctor Torey stand aside to the educational service of 2000 earnest young men and women with "their souls in the work of their hands," and their prupose to to be good citizens and help to build a state.

Community spirit here is of the right kind—repudiating in disgust the predatory and confiscatory doctrine of Russian communism. The Bolshevist creed is a noxious growth that cannot flourish in the rich black loam of Alberta with the oats and wheat. Perhaps the most vivid illustration of the richness of that soil was that of the man who said the cucumber vines grew so fast that they wore out the cucumbers dragging them along the ground. It is still proudly remembered here that it was Alberta wheat that took the prize at the Centennial in Philadelphia, in 1876.

Here is an instance of the way the people play the game all together. G. H. Coward, of Briercrest, Saskatchewan, lost his barn and thirteen horses in a fire at the end of May. He had finished his wheat seeding. He still had 190 acres of oats to plant in stubble ground. The neighbors got together at the instance of one of their number. On Wednesday, May 31, they mobilized with 112 horses and 24 outfits, including 12 double-discs and 11 six-horse drills, for the nicest kind of surprise-party. The women served dinner to the workers. The 190 acres were double-disced and seeded by the end of the afternoon, and a broken, discouraged man took heart again for "a hazard of new fortunes" and thanked God for such friends. Of course he would at any time have done the like for any one of them had the shoe been on his neighbor's limping foot instead of his own.

The exhibition grounds where the annual fair is held set an example to much larger places. At the edge of the fair grounds is a wooded grassy plot set aside for rural visitors who cannot very well take their abounding families to one of the hotels. There are skeleton frames for tent houses, and there is room to park the family Ford beside them: and in addition there is a free space where in seignorial independence one may set up his tent without a framework. Boiling water is on tap close at hand. But if you want water to wade and not to wash in, there is a pool clear and green, with a sliding board that dumps you shouting merrily and with a loud walloping splash that reminds one of a certain Negro baptism at New Orleans, when the preacher explained that "Baptism am derived from de good old Greek word 'bap,' which means de sound dat de candidate makes as he, she or it hits de water—'bap'!"

Mrs. Ellis, the lively livestock editor of the "Bulletin," took me to the stockyards, where there were fine cattle to be seen, but there is not one rat to wiggle a guilty whisker. I was weighed on scales as sensitive as a New England conscience and was told that I qualified for bacon but not for lard. Though I was glad to hear of a fairly active market for my patient brothers of hoof and horn about me, I felt the pathos of the situation for a farmer who brings in his cattle from afar only to learn that they are so thin he cannot get more than a cent and a half a pound for them. He must take his animals home at a dead loss for hundreds of miles—it may be—of hauling, or rent some nearer place to feed them till they qualify in an expert appraisal. Perhaps his Alberta winter left him the means for neither of these alternatives: and there are children's faces in the window for his homecoming. They expect Father to bring them something more than a leaden heart and a sad visage from the city.

We boast that there is no line of fortresses betwixt America and Canada, but the barrier of a high protective tariff that our selfishness has reared is almost as bad. Western Canada needs our farming machinery: we need her cattle, her grain and pulp-wood. If the Golden Rule is too quixotic for statesmanship to follow, then let politicians on either side of the boundary be instructed by self-interest that reciprocity cannot come to soon. God blessed both lands abundantly that they might give and take in the friendliest and most liberal exchange.

There are bituminous coal mines in and about the city, and it upsets one's predigested agrarian notions to find coal and oats raised on the same farm. I saw one such farm which from a patch directly over the mine-shaft took oats in 1921 worth $300. While the farmers raise cereals their offspring raise aerials on the roof of the house or the ridgepole of the barn. The radio uprights are common as lightning-rods are elsewhere. There are nearly 400 receiving-sets in and about Edmonton.

I visited the Journal office to see, and to share their broadcasting. The two masts on the Journal's roof are conspicuous punctuation-marks of the city's sky-line. A 500-watt equipment—the northernmost of the continent—enables the talk or the tune to be heard as far as Winnipeg, Vancouver or Oregon. A 2000-watt outfit under way will of course increase the distance enormously. During my visit a telegram reached a moving train 300 miles distant.

The meaning of this radio service to the dweller in the northern wild can scarcely be too strongly put. The old surreptitious rural amusement of "listening in" on a party line is now legitimized. It gives one a thrill to think of the size of the invisible simultaneous audience. Said one chronic seeker after political office, as he listened: "What an equipment to win elections!" He spoke in full and feeling awareness of the formidable "o'er moor and fen, o'er bog and torrent" to carry the appeal to an electorate face-to-face. The account of the journey of Satan in "Paradise Lost," when he "sinks or swims or wades or creeps or flies" through Milton's

INDIAN TEPEES

RIVER NAVIGATION BOATS TIED UP BECAUSE OF ROUGH WEATHER

ARCTIC RED RIVER AT THE BEGINNING OF THE MACKENZIE DELTA

cosmogony to the spoliation of Eden offers a parallel to electioneering in Alberta in the bygoing days.

Think of telling a bed-time story through 2000 miles of ether to a baby Eskimo at Coronation Gulf, or giving a performance of "Carmen" and "Rigoletto" to whalers marooned in Beaufort Sea! The day will come when an Eskimo prima donna from Greenland's icy mountains will be singing hymns to India's coral strands.

J. P. Henderson, a Dominion radio engineer at Fort McPherson, who has a very powerful receiving set, heard at Fort Providence the tidings of the Dempsey-Carpentier bruising-mill at Jersey City in 1921 from the transmitter at San Francisco. Even Honolulu and the Philippine Islands (a quarter of the way around the earth) have been heard in the Mackenzie valley.

The value of the radio to the fur-trade is many times the cost of this first sub-Arctic plant. Not long ago a trader who had sent his buyers afield with instructions to purchase at a certain fixed price found to his dismay when they got beyond his reach that the market was rapidly ralling. Before word could get to the agents the home office had lost at least $300,000. This season, fur-buyers will carry through the snows their individual receiving outfits, and at stated times they will receive instructions as to prices. Of course there will be no chance to talk back. It should be a very satisfactory way of managing a sales-force.

When I had "spoken my piece" into the phonograph-horn, Mr. Rice, the enthusiastic English impresario, called into the horn, "Hello, everybody!" to announce that the show was over. Then immediately he began to page Mr. Henderson, supposedly 2000 miles away, to tell him that I was coming to him presently via the Arctic Express and the Mackenzie River.

"Mr. Henderson! Mr. Henderson!" he called again and again, in his basso cantante. It seemed like giving a moose-call by night in a lonely, immeasurable forest. The cable which "the dumb sea-levels thrilled to hear" can never be half so stirring.

"Mr. Henderson!" the voice repeated. "I'm shifting over to C W."

This meant that Mr. Rice was changing from the spoken word to the key, and presently the message was sputtering and crackling under his fingers with blue flames on the keyboard. I wondered if it would find within earshot the man from whom it was meant, the man who—having no transmitter—could not answer. Of the radio it may be said as Thoreau said of truth—it takes one to speak and one to hear. Mr. Henderson, I afterwards learned, was in Ottawa at the time and did not get the message. Later, at Fort Good Hope I had the pleasure of meeting Mr. Henderson. He said: "It is very difficult to have to work against daylight throughout the Arctic summer. In the winter the atmospheric is greatly reduced. The radiophone is affected even more than wireless. The instrument that carries two hundred miles by day might have a range of a thousand miles at night."

The Peace River country rejoices in the cheery hail from Edmonton. On this great tributary of the Mackenzie is a tract of rich farming country as long as the distance from New York to Chicago, wider than New Jersey between Philadelphia and Atlantic City. Fort Vermilion is 300 miles from a railroad. There is one doctor there, and his next professional colleague is 300 miles away. One man with 13 children has had a doctor for 5. Now this whole region can be entertained and taught and one can imagine what it means to the people there.

Edmonton is the Athens of Alberta. The inhabitants are passionate readers. Mr. Hill (an enthusiast and an optimist) displays on a pillar of his public library the names and pictures of "our own authors," among whom Mrs. Emily Murphy ("Judge" Murphy) and Mrs. Nellie A. McClung deserve special mention. "Judge" Murphy is a wise, kind police magistrate, who would rather redeem than incarcerate. She has been head of Canada's "Women's Institute" with over 100,000 women in earnest at one time about the franchise, and always concerned in social welfare. She is deeply concerned to rid the land of the sinister traffic in opium, and other habit-forming drugs which leak in alarmingly through Vancouver: and she has written a book called "The Black Candle" to stir the public conscience against the evil. Under the pen-name "Janey Canuck" she has given the public a series of sprightly narratives based on her active career in the Northwest. Mrs. McClung is a novelist of international repute, whose incisive personality has won for her a host of friends. She is a member of the Provincial Legislature and is a steadfast proponent of measures designed to better the lot of women and children.

Edmonton is long and strong on luncheon-clubs. In a week the Canadian Club, with Premier Greenfield (a sturdy, wholesome farmer) and the Chief Justice present, listened to a talk on astronomy by Doctor Chant of Toronto; the Board of Trade heard a talk on the conservation of eyesight; the Rotarians and the Kiwanis Club had similar luncheon meetings. The Chateau Macdonald was alive with conventions and reunions. In all such gatherings men and women talk and think Canada.

I hob-nobbed with a veteran Alberta agriculturist, one chosen by fellow-farmers not only to sit in the Dominion Parliament in their behalf four years, but to represent them on a committee at Ottawa since. He is also a crop-agent of the Canadian Pacific.

"What are the big needs of the Canadian Northwest?" I asked.

"We need to have the Hudson's Bay Railway finished," he answered carefully. "That will take our wheat by a direct route to Europe."

"What next?"

"Well, we are very anxious to secure freight reductions. First, on our raw products—such as wheat, flax, barley, oats; then on our livestock—fat cattle, and sheep south of Edmonton, along the 'South Line' of the C. P."

"And after that?"

"Tariff reduction and an abatement of customs duties."

"Anything else?"

"We must have friendly trading-relations with the United States. The high tariff is a nuisance.

Then he unburdened himself freely.

"We ought to be able to take a grass-fed 1200-pound steer down to your corn-belt and feed him—'finish' him, as we say. We'd give him to you in exchange for shoes and clothing.

"Manitoba, Saskatchewan and Alberta stand for such reciprocity. Canada made a mistake in voting down the reciprocity proposals of 1911-1922 first put forward by Mr. Taft. The present Liberal government under Mackenzie would have accepted them.

"Our prairies are so far from coal, water transportation and the centres of population that they are not adapted to big manufacturing industries.

"We can raise steers more cheaply than you, up to the corn-feeding stage. You can manufacture more cheaply. We should do well to trade."

This man was a pioneer, in '82, from a 15-acre farm in the Orkneys. He has 500 acres in Canada, with 50 head of good shorthorn cattle and 30 horses. He uses no tractors because he cannot afford them. Having seen the Orkneys, I understood him when he said:

"I liked the pioneering freedom in Canada. Among the first settlers you find the community spirit. Tom Jones, we'll say, has a seed-drill. I have a broadcasting machine. I go to Tom and I ask him to lend me his drill. 'Why certainly, Jack.' Later he comes to me and wants to use my broadcasting machine. 'Of course, Tom.'

"This spirit is not found in the older settlements.

"It is important to note the growth and influence of the Grain Growers' movement. The 'locals' all through the Province have their annual convention. The inter-provincial body is the Canadian Council of Agriculture."

I asked him to tell me how he began as a farmer.

"I started 100 miles from the railway. When I drove in across the prairie I cooked my fat pork and bannocks on the way, melted snow to make tea, and thawed out my bacon. I didn't mind the cold. I have all my fingers and toes.

"Like my neighbors, I have measurably prospered. Last year there were rains, and rust. There were high freight rates, and a high cost of living in general. Reciprocity would double the population. Now we must bring goods over the long haul from the East, and the railway gets the rates.

"Protectionists in the eastern end of Canada say, 'No trucking with the Yankees.' But the Yankees are human beings. I let one marry my daughter.

"The tariff wall means huge investments for factories in both countries. Of course, at Ottawa the representatives of their sections do not see eye to eye, nor talk the same tongue with us farmers of the West. It's agriculture in western versus manufactures in eastern Canada. But the east has her agriculture too. Think how it injures New Brunswick and Boston alike, that when New Brunswick has an exportable surplus of potatoes she is cut off, by the tariff wall, from Massachusetts."

This weather-beaten husbandman was a democrat through and through—as democratic as a Greek in a vineyard of Corinth.

"The only question we ask about a fellow is, 'Is he a man?' Generally don't ask him. He has to prove that he is.

"As a rule, we're on the land about the first week in April." (He said "on the land" with a curiously hearty, buoyant fervor, and he pronounced April as Chaucer would have given it—"Aprile.") "We stay on the land up to the first week of November. We do have blizzards sometimes that a man would be foolish to put his face against them. But (with a smile) we know enough not to do that.

"Harvest hands, brought to Alberta at low railway rates, must work thirty days. Last fall as high as $7 a day was paid. The wages used to be from $3 to $5 a day. The hired men eats with the family. The daughters of the family wait on him at table. We give him the best of food. If you want to get the most out of a locomotive, you've got to feed it the best steam coal and water. The same rule holds good of hired men. The married man has house and firewood, sow, chickens and potatoes. Many farmers prefer the married to the single man because he stays put. Home brew is raising the mischief with men on the farms."

My friend, the philosophic farmer, it has been seen, put first in the list of western Canada's needs the completion of the railway to Port Nelson on Hudson's Bay, to release the wheat to Europe. He represents the attitude of the farm bloc at O'Harra. Another phase of the matter was vigorously put by a river captain who for sixteen years took a ship annually into Hudson Bay through the Straits and made the circuit of the Bay. "My boat was 2600 tons," he said, "carrying 1000 tons of bunker coal. Her plates were 3-inch steel. It would need a boat of 12,000 tons to carry enough grain to pay. My boat, with supplies for the Port Nelson terminal and other points, carrying nothing away, was not held to a schedule. A grain boat would have to leave on time. The Strais open to navigation about August 1, and remain open to the end of October at the latest. There are fogs and field ice. On the finest days the warmth of the sun striking the cold water produces vapor: one cannot be sure of clear days until September. The ice is not like that of lake or river: it is the polar ice, from a foot to 50 feet thick, and the floes may be four miles across. It is brought down by the cold current through Fox Channel. This current sweeps along the shores of the Bay. Though there are trees and vegetation, the frost reaches to a depth of 57 feet below the surface, and when we dug graves at Port Nelson we had to blast after we got to 18 inches.

"The Government shut down work on the Port Nelson terminal in 1917. The high water mark in the work there was reached in 1916, when there were 2500 men employed, and there were 25 miles of narrow-gauge railway in the yards. Now the place is reduced to half a dozen watchmen. There is a dredge that cost $350,000 to build. There are other dredges and scows on the beach. There is a fully equipped machine shop.

"What may happen is illustrated by our experience with a 3000-ton ship in the mouth of the Nelson. She broke two of her propeller blades—not opposite but adjacent—and then the other two snapped, 8 inches and 4 inches from the boss (the hub). We pumped out the water ballast from the stern and shifted the cargo forward until the stern was high out of the water and the deck forward was under the waves just as if she was going down by the head. Then we unshipped the broken propeller and put in the spare one we carried. If a wind had come up, it would have been good-night.

"The country back of Port Nelson is muskeg, and pretty rotten muskeg it is. Some day, may-be, they'll drain it and raise wheat there. I'm not prophesying about the future. I simply want to point out that moving a big grain-ship on schedule time is a very different matter from carrying a cargo of furs worth hundreds of thousands of dollars in a small space with no time-limit on the movements of the boat.

The best traditions of journalism in Canada are exemplified in Edmonton's grand old man, Frank Oliver. What he does not know of the pioneer days is hardly worth knowing. A former Minister of the Interior he is learned in politics and policies, but in place of vanity is dignity, in place of selfish aim is a desire to serve: the sage is a quiet, modest, affable, amiable Christian gentleman. You should have his story at his lips of his voyage from the Mackenzie by way of the Peel and the Porcupine to the Yukon. He makes it sound as free from hazard as croquet on a lawn. The lore of agriculture and temperature, and natural resources, and reasonable prospects, flows from his lips as from an oracle: yet he is not one of those who led James Monroe Buckley to say, "It is a dangerous thing for a man to start his mouth going and then go off and leave it." With the final authority of one who knows he tells you what you want to know.

Another of the names of the old-timers held in high regard is that of Ex-Mayor John McDougall. On a silver chest presented by his fellow-townsmen there is at one end an engraving of the ox-cart in which he came to the Hudson's Bay Company huts that were Edmonton in 1876. At the other end is one of the trolley-cars he started running through the streets in his administration. The span of this man's career, from the ox-cart to electric power, epitomizes the history of Edmonton.

OLD TRAILS AND NEW PEAKS IN THE CANADIAN ROCKIES.

J. MONROE THORINGTON, M.D.

In the early days of exploring for a practicable pass through the Rocky Mountains, on which to locate a trans-Canadian railroad, attention centered upon several gaps in the main range which had long been in use as fur-trade routes.

The northerly of these passes, Yellowhead Pass, 3237 feet, was discovered about 1826, and served as means of transportation between Hudson Bay and the settlements of New Caledonia. It was also known as Leather Pass, although it shared honors with Peace River Pass, which was first used for this traffic. Yellowhead Pass is now crossed by the Grand Trunk Pacific and the Canadian Northern railways, passing in their westward course from the Athabasca to the Fraser River valley. The Grand Trunk Pacific continues northwesterly by the Fraser valley, while the Canadian Northern turns abruptly southward, to reach Kamloops by way of the Albreda and North Thompson rivers.

Approximately a hundred and twenty miles farther south, the Continental Divide is broken by Howse Pass, 5010 feet, connecting North Saskatchewan sources with Columbia River drainage. It was traversed by David Thompson, of the North West Company, as early as 1807, perhaps by McGillivray in 1801, and was long used as a means of communication between the Kootenay Plain and the Pacific slope. By 1881, when the Canadian Pacific Railway Company was chartered, it had been decided to abandon the Howse Pass route in favor of Yellowhead Pass, the latter affording lesser gradients and a greater choice of Pacific terminals.

Thirty-five miles south of Yellowhead Pass, the main range is crossed by an historic route of travel. Athabasca Pass, 5751 feet, was discovered in 1811, by David Thompson, after he had been turned back from Howse Pass by war-parties of the Piegan Indians. In 1814, Franchère crossed the pass from west to east, bringing with him returning settlers from the Astoria colony at the mouth of the Columbia. In 1817, Ross Cox, one of Astor's clerks, crossed the pass with a similar party of the old Tonquin adventurers.

BOW LAKE

HEAD BASIN OF FRESHFIELD ICEFIELD, A SOURCE OF THE NORTH SASKATCHEWAN RIVER. PEAKS OF CONTINENTAL DIVIDE IN BACKGROUND

PACK-TRAIN FORDING MISTAYA RIVER

Alexander Ross, with Sir James Simpson, in 1825, followed this route.

Through the pass, in the spring of 1827, with the York Factory brigade of Edward Ermatinger, came the Scotch botanist David Douglas, after whom the Douglas fir is named.[1] He ascended a peak on the north side of the pass, naming it Mt. Brown; a peak a little to the south was named Mt. Hooker, in honor of the Professor of Botany in the University of Glasgow. Deceived, at the time perhaps, by the winter conditions prevailing, and later by exaggerated reports of altitude, Douglas ascribed to these peaks, "the highest yet known on the Continent of America," a height of 17,000 feet. These heights have long been disproved, neither of the peaks being much over 10,000 feet, but they were for years conspicuous on many maps, while the search for such lofty altitudes aroused the curiosity of alpinists who came later, and was the foundation of Canadian mountaineering.

It was felt that a more direct passage to Kamloops could be found, and, in 1882, the practicability of Rogers Pass across the summit of the Selkirks being ascertained, the railway location was diverted from Yellowhead Pass, to its present position, one hundred and sixty miles farther south, in Kicking Horse Pass.

Kicking Horse Pass, 5329 feet, was discovered, in 1858, by Dr. Hector, of the Palliser Expedition, sent out by the British Government. His party had travelled from Bow Fort and crossed the Continental Divide by Vermilion Pass. Reaching the headwaters of the Kootanie River, they traversed a height of land, and descended the Beaverfoot to its mouth, "a large flat, where the wide valley terminated, dividing into two branch valleys, one from the north-west and the other to the south-west. Here we met a very large stream, equal in size to the Bow River where we crossed it. This river descends the valley from the north-west, and on entering the wide valley of Beaverfoot River, turns back on its course at a sharp angle, receives that river as a tributary and flows to the south-west through the other valley . . . One of our pack horses, to escape the fallen timber, plunged into a stream, luckily where it formed an eddy, but the banks were so steep that we had great difficulty in getting him out. In attempting to reach my own horse, which had strayed off while we were engaged with the one in the water, he kicked me in the chest, but I luckily got close to him before he struck out, so that I did not get the full force of the blow . . . . We passed many small lakes, and at last reached a small stream flowing to the east and were again on the Saskatchewan slope of the mountains."

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[1] It is of interest to note that Douglas spent the fall of 1823 in the vicinity of Philadelphia, visiting, among others, the gardens of Messrs. Landreth, Bartram, Hamilton, and Nuttall.

Thus, of the four passes whose early history has been outlined, railroads now traverse the Yellowhead and Kicking Horse, while Athabasca and Howse Passes remain even less frequented than in the days of the fur-trade. Between Howse and Athabasca passes, there is no crossing of the Divide suitable for horse transportation, the western slopes being steep and the valleys, tributary to the Columbia through the Bush River system, laborious and difficult.

It is but natural that the casual tourist should see only the margins of this mountain land; the Lake Louise groups, peaks above Emerald Lake and the Yoho valley; or, if one travels by a northern route, a glimpse of Jasper Park or Mt. Robson. But in the area between the railroads is found a series of enormous, seldom-visited groups, with untrodden peaks, huge icefields, deep forested valleys, and hidden lakes. Immediately north of Kicking Horse Pass, the Yoho-Waputik group extends to Howse Pass, an airline of thirty miles. Only a little of it is seen by visitors to the Yoho valley and, in its northern portion, the icefields have a combined area of nearly forty-five square miles, the drainage being chiefly eastward into Bow River, the South Saskatchewan headwater.

North of Howse Pass, the Continental Divide progresses to Bush Pass, in an irregular semicircle filled by the Freshfield icefield, twenty square miles, a southern source of the North Saskatchewan. On the west side of the Freshfield group, the Campbell icefield forms the chief source of the South Fork of Bush River, draining to the Columbia. The Freshfield glacier was discovered in 1860, by Dr. Hector. "The upper part of the valley which it occupies, expands considerably, and is bounded by a row of high conical peaks that are completely snow-clad. We walked over the surface of the ice for four miles, and did not meet with many great fissures. Its surface was remarkably pure, and clear from detritus, but a row of angular blocks, followed nearly down its centre. Its length I estimated at seven miles, and its width from one and a half to two miles."

A northward air-line of twenty miles carries the Divide to Thompson Pass, passing over the Forbes-Lyell groups en route. The Lyell icefield system is a large one, the glaciers on the Mt. Lyell massif being over thirty-five square miles in area. It was discovered, in 1859, by Dr. Hector. "I wished Nimrod to go with me, but he would not venture on the ice, but told all sorts of stories of sad disasters that had befallen those Indians who did so; how that, if they did not get lost in a crevasse, they were at least sure to be unlucky afterwards in their hunting .... By rough triangulation I found that the width of the terminal portion of the glacier in view from this point was 550 yards .... I now saw that the glacier I was on was a mere extension of a great mass of ice, that enveloped the higher mountains to the west, being supplied partly through a narrow spout-like ice cascade in the upper part of the valley, and partly by the resolidifying of the fragments of the upper *Mer de Glace,* falling over a precipice several hundred feet in height, to the brink of which it is gradually pushed forward .... We had a splendid view over the *Mer de Glace* to the south and west, the mountain valleys being quite obliterated, and the peaks and ridges standing out like islands through the icy mantle."

Alexandra River, the old "West Branch" of the North Saskatchewan, has its sources in the glaciers near Thompson Pass, the drainage on the western side of the pass being to the North Fork of Bush River. The valley of Alexandra River is the usual route to the heart of both the Lyell and the Columbia groups, the latter forming the Continental Divide between Thompson and Fortress Lake passes, an air-line of about thirty miles. The Columbia group is not well known, having been visited by only a few parties since the discovery of its icefield, by Dr. Collie, in 1898. The Interprovincial Boundary Survey has been over the area in recent years, but their data have not been published. The great number of high peaks—more than twelve over 11,000 feet—and the unusual extent of glaciation raise the group to a position of scenic grandeur unsurpassed by any other region of the Canadian Rockies, although it does not include their loftiest summit. Mt. Columbia, 12,294 feet, the culminating peak, is exceeded in altitude only by Mt. Robson itself, 13,068 feet, the highest of the entire range. Mt. Robson is situated on the Continental Divide, the Pacific-Arctic watershed, north of Yellowhead Pass, but it rises from no icefield comparable to the Columbia.

The Columbia icefield, in the central portion of the group, covers an area of about one hundred and twenty-five miles, the largest in the range, . . . "to the westward, (from Athabasca Peak) stretched a vast icefield, probably never before seen by human eye, and surrounded by entirely unknown, unnamed, and unclimbed peaks. From its vast expanse of snows the Saskatchewan glacier takes its rise, and it also supplies the head-waters of the Athabasca; while far away to the west, bending over in those unknown valleys glowing with the evening light, the level snows stretched, to finally melt and flow down from more than one channel into the Columbia River, and thence to the pacific Ocean. . . . directly to the westward of Peak Athabasca, rose probably the highest summit in this region of the Rocky Mountains. Chisel-shaped at the head, covered with glaciers and snow, it stood alone, and I at once recognized the great peak I was in search of; moreover, a short distance to the north-east of this mountain *(i. e., Mt. Columbia.)*, another, almost as high, also flat-topped, but ringed around with sheer precipices, reared its head into the sky above all its fellows. At once I concluded that these might be the two lost mountains, Brown and Hooker." The icefield is the hydrographic apex of the Rocky Mountains, "for the meltings of its snows descend into three great river systems, flowing into three different oceans—to the Columbia and thence to the Pacific; to Hudson's Bay via the Saskatchewan; and by the Athabasca to the Arctic Ocean."

From Mt. Columbia, the Continental Divide traverses peaks that are but little known; the area between Fortress Lake and Athabasca Pass is practically unexplored except by the Interprovincial Boundary Survey. The Whirlpool group includes some high peaks and a few extensive glaciers, the drainage to the north and east being to the Athabasca system, while on the British Columbia side the streams are tributary to the Wood River and the Columbia. It should not be forgotten that there are other fine groups in this region, not situated on the Divide; the Wood River group containing at least five peaks over 11,000 feet high. Moreover, when the Chaba system is completely mapped, its icefields will perhaps equal in combined area the extent of the Columbia.

The region near Athabasca Pass is accessible by the northern approach through Jasper Park, and affords a splendid field for bits of exploration in a virtually unknown area. North of the pass, the principal peaks on the Continental Divide, the Athabasca-Fraser watershed, form a part of the conspicuous Rampart group and extend the range to Yellowhead Pass.

Thus it will be seen that, between the railroad belts, the Continental Divide is formed by a lofty mountain chain, about equal in extent to the European Alps between Mont Blanc and the Bernina, but more directly continuous as a range. In the Canadian Alps, there are no "centres" off the beaten track and it is, therefore, impossible to visit the interior groups without the assistance of pack-train and camping outfit. Much of the literature on the region is out of print and accessible only to those who are willing to make a patient search for desired information.

During 1922, the writer had the opporunity, in company of Mr. Howard Palmer and the Swiss guide Edward Feuz, of visiting the Freshfield group, climbing some of its finest peaks, and following parts of the old trails made known by David Thompson and Dr. Hector.

Our outfit left Field early in July, journeying northward by way of Amiskwi Pass. Views of the Van Horne and northern Yoho peaks are features of the route, the buttresses of Mt. McArthur being a conspicuous landmark for many miles along the trail. There are heavily timbered stretches, where one rides for many minutes, with no view save patches of blue sky and slants of sunlight in the tree-tops; then a sharp descent to a rushing stream; the horses splash through the milky glacial water and one catches a glimpse of snow peaks far up the valley.

The descent from Amiskwi Pass to the Blaeberry valley is a steep drop of 3000 feet. A black bear preceded us and his tracks indicated that he was in a hurry; at least we never saw him. Across the valley, the view is dominated by Mt. Mummery, a snowy massif, with its blue-green glacier tongue curiously split by a long central moraine. We forded the Blaeberry, our seventeen horses trailing through the water, and camped in the meadows beyond. All afternoon, another black bear—perhaps a neighbor of the Amiskwi traveler—wandered about our camp ground and we could see the tips of his ears above the scrub bush as he cautiously raised up to investigate our presence.

Our route to Howse Pass lay up the Blaeberry valley, crossing and recrossing the diminishing stream as we neared the summit. We made camp below Mt. Conway, in a beautiful meadow not far from the pass summit and spent the afternoon in a visit to the cirque below the Conway glacier. The basin is a large one, extending for several miles into the heart of the group; a precipitous hanging glacier cascades down from the north face of Mt. Conway, while the main tongue curls over a terminal cliff several hundred feet in height and sends down slender waterfalls to the amphitheatre in which we stood. From camp, we watched the sunset turn the tip of Mt. Forbes into an incandescent spire while the base of the peak was banked in rose and violet clouds; there was a full moon in the evening and by the fire the guides told stories of the old explorers who passed this way. Who can say that David Thompson or Dr. Hector may not have silently joined our group as invisible guests?

Next day we descended the canyon of Conway Creek to its junction with Freshfield and Forbes brooks, a tremendous amphitheatre from which flows Howse River. If the railroad had ever come this way, here would have been the place for a hotel. To the east rise Mt. Kaufmann, White Pyramid and Howse Peak; south is the Freshfield group; while westward, the massive outlines of Coronation Mt., the saddle of Bush Pass, and the grim towering peak of Mt. Forbes, complete a splendid panorama. On a little gravel cliff we had the unusual experience of catching a baby goat, who had apparently strayed from home. The little animal was headed off by a horse on each side and a small stream in front; when several of us approached, the goat gave a frightened leap, fell in the water and was rescued, kicking and struggling. Being released, it proceeded with all speed, but with a damp and injured air, down the Saskatchewan gravel bars.

We followed a rising trail into the woods and shortly made camp at the edge of the timber below the Freshfield glacier. It is an ideal situation, a terrace of old moraine with the ice-tongue less than half a mile away and the pointed summit of Mt. Freshfield at its head. A forget-me-not covered slide, close at hand, affords good grazing for the horses; strangely, there had been but little grass between Field and our present location.

We had brought with us the new map of the Freshfield group, Sheet 18 of the Interprovincial Boundary Survey; it names many new peaks and gives the first accurate representation of the topography. Mt. Freshfield had been climbed in 1902 by Collie, and was then considered the highest peak of the area; but on the new map we had found a peak on the Divide, Mt. Barnard, higher than Mt. Freshfield and, therefore, the loftiest summit of the entire group. It lies south of and hidden by the Pilkington-Bulyea ridge and is quite invisible from the glacier tongue. The mountain had apparently never been climbed and we determined to make it our goal

On July 11th, we back-packed an advance camp three miles up the ice to a promontory below Mt. Niverville; at 7200 feet there is a picturesque heather-covered meadow, with firewood, water and small trees. This camp was maintained as a central point for climbs until July 18th.

The Freshfield icefield may be divided into three sections: an icefall basin descending between Mt. Dent and Mt. Walker; an upper snow basin, rising high up on Mt. Walker, extending southward to Mt. Barnard and eastward to the snow dome of Mt. Gilgit, where it drops off in cornices and cliff; a lower head-basin descending from Mt. Barlow and adjoining peaks and linking with the other divisions in a series of flat areas and icefalls that discharge through the Freshfield glacier. From minor peaks south of Bush Pass, the Niverville and Pangman glaciers enter the Freshfield basin but are only loosely connected with the main icefield. Much of the upper ice is stagnant; surface drainage is incomplete and in the late afternoon large areas are flooded. Medial moraines are a striking feature and may be traced for several miles to the promontories in which they originate.

On July 14th, we made the first ascent of Mt. Barnard, 10,955 feet. From camp we crossed the icefield for two miles to the base of Mt. Walker and ascended hard snow over a much crevassed section, requiring many deviations before reaching the upper snow basin. Mt. Barnard was far ahead of us, the main ridge running north-west and south-east, its north face snowy and broken by schrunds. Its appearance exceeded our expectations; a Lyskamm in miniature with a sharp snow-spire to the north-west. Crossing a mile of flat snow, we reached its base at the south-eastern end; here the schrunds were sufficiently bridged to permit our crossing, although the snow above was steep and soft. Proceeding with caution we reached the ridge, much pleased that the snow had maintained its angle of rest. A high wind met us, but our footing was now more secure and we proceeded. There were bits of step-cutting to be done in the couloir heads above the south face, but two hours more brought us to the base of the peak and a steep ascent placed us on a snowy top scarcely big enough to hold us. While distant views were somewhat obscured by smoke, the sheer drop on the south and west to the Campbell icefield was always spectacular. We built a little cairn, descended to the north arete and finally glissaded down to rejoin our old track.

We spent the remainder of the day in making the first ascent of Mt. Trutch, 10,960 feet, a peculiar fin-like peak of the Divide, and visible from camp. A single north-west arete rises like a ridge-pole to the summit, followed by a sheer drop to the ice. There was no great difficulty, but the final 400 feet, invisible from below, turned out to be a knife-edge of rock which had to be straddled and took some time to negotiate. From the summit there was no alternative route, so we retraced our steps, reached the snowfield and tramped back to camp. We had travelled about fifteen miles on the ice and had climbed two big peaks within fifteen hours.

On July 16th, we made first ascents of Mt. Nanga Parbat, 10,780 feet, and Mt. Gilgit, 10,300 feet, peaks of the Divide, lying east of Mt. Trutch. Mt. Nanga Parbat was traversed from north to south; it is a fine symmetrical snow peak and showed to great advantage from our camp. From the dome of Mt. Gilgit, heavily corniced to the north-east, we enjoyed a most extensive outlook; to the north, across the icefield, the magnificent pyramid of Mt. Forbes dominates the panorama, with Mt. Columbia and the Lyell summits on one side, and distant Mt. Brazeau, with its snowfields on the other. The Continental Divide was visible as far south as Lake Louise. The south-east ridge of Mt. Nanga Parbat curves brokenly and rises to the spires and pinnacles of Mt. Mummery, whose tremendous black precipices wall the head of Waitabit Valley. Rugged peaks along the Blaeberry are separated from the bordering ranges of the Columbia valley by the Waitabit gorge, through which we caught dim fleeting glimpses of the Selkirks.

On July 18th, we made an ascent of Mt. Freshfield, 10,945 feet, but smoke obscured distant views; in the afternoon, we packed our belongings down to the lower camp at the Freshfield tongue. On July 20th, an ascent was made of Coronation Mt., 10,420 feet, from the glacier via the Garth-Coronation gully. The ascent is steep and the final ridge, with its sheer fall toward Forbes Brook, is interesting work. Mt. Forbes was directly opposite and its superb ridges loomed dimly through the smoke, but there was no distant view.

Our program was now complete; six ascents had been made, the highest peak was ours, and in the intervals we had roughly surveyed portions of the ice tongue and measured its rate of flow. On July 21st, we broke camp and descended Howse River to a point below the mouth of the Glacier Lake stream. Alpine flora gives the river flats a gay appearance and game tracks are everywhere; moose, bear, deer and goat trails crossing and recrossing. Every evening at the Freshfield camp, we had watched through binoculars the big billy-goats come out to feed on high alpland above the cliffs.

Next day we rounded the base of Mt. Sarbach, ascended Mistoya River and made camp at the base of Mt. Chephren. Clearing weather gave us beautiful views of Mts. Kaufmann, Wilson and Murchison, gleaming with new snow. Our route thence lay over Bow Pass to Bow Lake, with views to the north of giant peaks near Wilcox Pass. Southward, Howse Peak and the Waputiks form a stupendous wall, with occasional gaps through which one glimpses distant snow peaks and interlocking icefalls. On the eastern side of Mistaya Valley, rocky pinnacles above the Wildfowl lakes give way to slightly lower and more separated summits which buttress Bow Pass.

Our lake camp was finely situated in a grove of old trees extending to the water's edge. White-tail deer came down to drink and frequently walked past the tents; we could have caught them with a rope. Trout abound in the lake, but the larger ones were always too much for our primitive tackle; a splash, a bit of line flicking skyward on the end of a green pole, a man sitting down with unexpected suddenness, and language usually reserved for private conversation with the horses! Through a gap at the end of the lake, the snow slopes of Mt. Hector are seen rising to a sharp peak;

opposite us, the cliff wall beginning at Bow Peak supports the Crowfoot glacier, while further north the Bow icefall breaks through between St. Nicholas and Portal peaks.

The distance to the railroad, twenty-six miles, is usually broken by a camp on the slides below Mt. Hector. Down the Bow valley one sees the peacock-blue water of Hector Lake and the delta made by the entering stream from the glaciers of Mt. Balfour. And finally, through the clouds, the groups above Lake Louise came into view, Mt. Temple and the Victoria ridge, and the journey was at an end.

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DIXEY'S PHYSIOGRAPHY OF SIERRA LEONE.

By William Morris Davis.
Harvard University

An essay by F. Dixey, government geologist, on the Physiography of Sierra Leone, the British protectorate facing southwest between French Guinea and Liberia, where Africa turns its North Atlantic coast into the Gulf of Guinea (Geogr. Journ., lx, 1922, 41-61, with 8 half tone views and a map, 1 : 1,250,000, colored in 5 zones of altitude), is of interest as a contribution to a physiographically little known continent. It is here abstracted and somewhat rearranged with particular relation to its value as an example of the increasing use of an explanatory method in the description of land forms, and in the hope that it may encourage others to make still further application of that method. If all the regions of the world were described as intelligibly as Sierra Leone has been by Dixey, geography would be immensely advanced.

General Features of the Protectorate. The protectorate has an ocean frontage of nearly 200 miles and an inland reach of from 140 to 170; its area is about 271,000 sq. miles. The colony of the same name is but a small fraction of the protectorate in area and occupies a mountainous peninsula measuring 25 by 14 miles, which rises with a height of 3000 feet from the otherwise low coast, 30 miles from the northwest boundary. The interior half of the protectorate consists of uplands and highlands of granitic and related rocks, for the most part overlaid with unconsolidated sands; ascent there is made in a succession of benches or "plateaux" to the inland boundary which lies at an altitude of from 3000 to 5000 feet on or near the divide between the coastward rivers and the headwaters of the Niger, at the beginning of its long and round-about eastward course to the Guinea Gulf. The lower or seaward half of the protectorate is occupied by a coastal plain, broadly benched in several platforms and composed of bedded sands and clays, partly of marine, partly of fluviatile or lacustrine origin. These sands and clays, usually surfaced with laterite, rest uncomfortably on an uneven

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and greatly degraded floor of schists and gneisses near the coast and of sedimentary and volcanic rocks farther inland, all usually having northwest trends; at their inner border the plain strata overlap the upland granites. Their thickness is seldom more than 100 feet, except where they bury valleys. The scarps which usually limit the plateaus of the interior highlands and the platforms of the coastal plain are of variable height and steepness; they are by no means parallel to the coast or to one another, but follow irregular courses with many salients and re-entrants. The scarps of the coastal-plain platforms and of the lower plateaus are ascribed chiefly to marine erosion during pauses "in the course of an intermittent uplift which has operated through Tertiary times almost down to the present day." The adjoining sea is shallow, depths of 10 fathoms being rarely found within 30 miles of the shore.

The Plateaus of the Uplands and Highlands. The lowest and perhaps the largest of the highland benches, the Koinadugu, occupies an extensive area in the center of the interior and "consists of several plateaux which do not differ very much in height," ranging "from about 1400 to 1700 feet above sea level.... Many low scarps and plateaux, carved into the crystalline rocks, can be seen rising above the main plateau in various parts." In one district "there are several flat-topped hills rising about 200 feet above the general level of the country." Sometimes a low secondary or second-story plateau surmounts a first: "In several places such low plateaux, as they are followed outwards towards their margin, are seen to be intersected by broad, flat-bottomed valleys with steep rocky sides, which cut down to the level of the main plateau; nearer the margins these plateaux become penetrated by numerous small inlets, after which they become broken up into a fringe of low hills with flat tops and rocky sides. These conditions . . . strongly suggest that marine erosion has played at least some part in the present configuration of the Koinadugu plateau." Certain parts of the frontal scarp by which this broad bench is limited, "although indented by deep bays and long narrow inlets," are well defined, sometimes taking the form of a "bold inland cliff," with a height of 800 feet. Other parts of the margin "are only very vaguely defined." The isolated Lokko mountains, rising over the highest platform of the coastal plain, "may be regarded as an outlying portion of the great Koinadugu plateau," from which they are 10 miles distant.

Higher plateaus of smaller area occur at altitudes of from 2200 to 2600 feet, and of from 2800 to 3200 feet; one of the latter south of the source of the Niger is remarkably level as seen from a distance, "owing to the presence of several residual patches of a once-extensive sheet of dolerite"; its western scarp, rising 1700 feet from a lower plateau, "forms an imposing feature." Another plateau "measures about 8 miles from west to east, ... possesses a well-defined scarp . . . [and] is locally overlain by sheets of basalt." This plateau is surmounted by "enormous towering pinnacles, of extraordinary aspect, which rise several thousand feet . . . [and] probably attain a height of fully 5000 feet above sea-level. The broad flat tops of several of the mountains indicate the presence of an ancient plateau."

The highest of the plateaus has an altitude of nearly 5000 feet, and is the uppermost of a succession of crystalline benches known as the Loma mountains, which rise boldly out of the Koinadugu plateau and form part of the main divide near the head of the Niger. This highest bench "supports several more or less conical peaks. Bintumane, the tallest of those peaks and also the highest mountain of the protectorate, towers more than 1000 feet above the plateau . . . A remarkable feature of this mountain is that it is capped by a sheet of coarse dolerite, which is 250 feet thick and about 400 yards in length; this flat summit is the only remaining portion of the oldest plateau of the Protectorate." Altho parts of these lofty plateaus "are even now in a wonderful state of preservation," they "have all suffered extensive erosion . . . [and] on the whole their surfaces are strongly corrugated." Somewhat farther south a highland area seems to correspond to the 5000-foot plateau of the Loma mountains, but it is much dissected and "is now represented by numerous towering peaks and mountains, some of which possess summits that are still remarkably flat." Near the Anglo-French boundary, the Saionia plateau, 2000 feet in altitude, is unlike the others in consisting of heavy horizontal sandstones, lying on crystalline rocks and covered by a sheet of dolerite; the scarp of this plateau reaches a height of 1600 feet; the sandstones have great extent in French Guinea.

"The scarps of the various plateaux show very great variety in their state of preservation; some of them are still bold and rocky, following siriuous and indented courses, while others are so worn that they exist only as tracts of hilly country intervening between two plateaux of different height." On the northern or inland side of the Loma mountains, "the scarp separating the 2700-foot from the 1600-foot plateau is highly precipitous over many miles of its length." Some of the plateaus slope gently to the east, apparently as a result of slight inequality in uplift. Except for the valleys by which they are trenched, . . . "the plateaux are sometimes surprisingly flat over considerable distances, and in such cases they are either thinly covered by lateritic gravel, supporting a sparse orchard bush, or they are quite bare." These flat areas "sometimes give rise to extensive swamps." Elsewhere the plateaus are diversified by "broad low hummocks, possessing smooth rounded contours, which rise 100 to 150 feet above the general level"; or by "low parallel ridges . . . [running] with the jointing of the granite"; or by "innumerable low rocky hills, like small tors or kopjies, ranging up to 150 feet in height . . . scattered over the surface . . . [but] sometimes so numerous as to be more or less in contact"; or near the scarp of a higher plateau, by "residual mountains, or inselbergs, characterized by a dome-like upper surface and steep precipitous flanks. These mountains, which are often devoid of vegetation apart from a few tufts of grass, vary in height from several hundred feet to 1500 feet or more . . . Relics of ancient valleys . . . may be seen at different places on the various plateaux; [they] bear little if any relation to the drainage of the present day; [they] are often broad, flat-bottomed and steep-sided; their crystalline floors are flat or in some cases hummocky; [and they] are generally occupied by streams which are proportionally very small . . . [Even] the summit of Bintumane is traversed from west to east by the remnant of a little valley; at either end this valley terminates abruptly in mid air."

But the plateaus have another characteristic:—They are largely covered with unconsolidated deposits, which consist of "fine dusty sand mixed with a variable proportion of angular and sub-angular quartz grains, and often contain large and small angular fragments of quartz and of kaolinized granite." The sands rest upon smooth and comparatively unweathered rock surfaces, ranging in altitude from 1000 to 5000 or even 6000 feet; but their deposition was later than the erosion of the deep valleys by which the plateau margins are trenched, for the sands "completely filled even the largest valleys incised into the plateaux." The sands are believed to have "originated" during a period or periods of great depression, when processes of decay and accumulation were at a maximum." No further explanation is offered. The surface of the sands, which were not lateritized offer large fertile areas, is strikingly modified by terraces, that are analogous to the terraces of the coastal plain and that are thought to have "been carved out . . . by marine erosion . . . during the intervals between successive uplifts." The relation of the bare-rock areas to the sand-covered areas of the plateaus is not clearly stated; but it is noted that "the modern scenery of the upland areas is greatly influenced by the presence of the Plateau Sands; in many localities the irregularities of the ancient crystalline landscape are either hidden from view or softened in outline, while in others the uneven erosion of the sands has given rise to numerous low rounded and flat-topped hills which lie freely scattered over the various crystalline platforms" [plateaus].

The Coastal Plain and its Platforms. The irregular inner margin of the coastal plain deeply indents the highlands near the Anglo-French boundary. The south-eastern half of the coastal belt includes a part of the West-African tropical forest, much of which however has been destroyed by repeated cutting and burning, and replaced by grass and orchard bush. The largest area of forest remaining is near the Liberian frontier, and is "the home of large anthropoid apes, as well as of elephants and hippopotami." The northwestern half of the plain belt enters the drier zone of savannahs or steppes: there as well as on the lower plateaus the oil palm flourishes. The surface of the plain, generally encrusted with laterite or cemented gravels, is for the most part gently undulating, but sometimes amazingly flat even far inland; there it is flooded in the rainy season and swampy in the dry season; the cultivation of rice is proposed on such areas. All platforms into which the coastal plain is divided dip gently seaward, and are named below according to the maximum altitude of their inner border. Altho one may travel many miles over the certain parts of the plain without seeing any rock ledges, the underlying rocks elsewhere rise in hummocks, hills or ridges, trending with their strike. Some of these emerging rocks in the lower platforms support table-like remnants of higher platforms. The emerging volcanic rocks are "generally very rugged, and encumbered with innumerable crags"; they constitute "a chain of hills that can be traced across the country for nearly 100 miles" to the Anglo-French boundary. "Even where these rocks do not form hills, they often cause the surface of the plain to be broken up by a large number of low rocky mounds."

The main platform of the coastal plain attains an altitude of 400 feet at its inner margin. Remnants of higher platforms of a considerable extent lie farther inland against the scarped or hilly border of the highlands, with maximum altitudes of 750 feet; the largest of these remnants, measuring 45 by 25 miles, stands near the southeastern border of the protectorate, and is "interrupted by high flat-topped [rock?] hills and groups of peaks . . . some of which attain a height of 900 to 1000 feet above sea-level." The platform remnant passes into the rock plateau on the north through a belt of flat-topt rocky hills, the summits of which correspond in altitude to the plateau; the same platform remnant passes into the 400-foot platform on the south through an irregular hilly zone, the foot of the hills being at the level of the lower platform. Other remnants of the highest platform are represented by flat-topt hills or ridges, up to several miles in length, scattered over the main 400-foot platform. The lower platforms towards the coast are in some places separated by a steep scarp, in others by a narrow belt of hills or by a zone of greatly increased slope.

Both the plateaus and the platforms having now been described, it may be noted that "the principal reason for regarding the lower plateaux at least as marine in origin rests mainly in the fact that a close analogy may be observed between the relations which the various platforms of the coastal plain bear to each other, and the relations to one another of the lower plateaux of the upland areas." This analogy "is seen mainly in the presence in each of deeply embayed scarps, the larger indentations of which pass upward into ancient valleys, in the presence of flat-topped 'islands' that attain to the level of the adjacent plateaux, and in the manner in which the lower plateaux more or less completely encircle the upper. Finally, the disposition of the plateau sands with regard to the crystalline plateaux is in many respects similar to the disposition of the sediments of the coastal plain with regard to the [underlying?] crystalline platforms."

The Rivers. "Owing to the intermittent character of the uplift that produced the coastal plain, the variable nature and uneven surface?] of the rocks underlying the plain, and the variable strength of the rivers themselves, the rivers flowing across the plain show different stages of maturity and rejuvenation both within themselves and as compared with one another." Many of them "offer remarkable contrasts in the development of their upper, middle and lower courses." The upper courses which descend the benched slope of the granitic highlands, altho of ancient origin, have been so repeatedly rejuvenated that their deep valleys are still sometimes narrow, and their flow is often broken by rapids and falls. A headwater stream that descends the scarp of the Loma-mountains plateau near the surmounting mass of Bintumane "forms a beautiful slender waterfall of great height." A large river that descends over the much-worn scarp of the Koinadugu plateau to the inner margin of the coastal plain forms "a magnificent waterfall . . . In the dry season the falls, which are about 85 feet wide, attain a height of 90 feet, but in the rainy season, owing to the banking up of the water in the narrow gorge immediately above, they are probably well over 100 feet in height. For a considerable distance above and below the falls, the river traverses a long series of rapids and steep cascades."

In their middle courses the rivers flow through open valleys eroded in the weak strata of the coastal plain. The valley floors have been repeatedly graded in the intermittently rising plain, first with respect to sea level but eventually with respect to resistant rocks in thir lower courses. The rivers have thus opened flood plains at successively lower and lower levels, the higher ones now being terraced by the excavation of narrower lower ones beneath them. In some cases these mature valleys seem to extend into the upland plateaus, for "along the sides of large flat-bottomed valleys running into the upland country, low broad benches about 50 feet high can frequently be seen carved out of the solid rock." Furthermore, "the thick crust of laterite and cemented lateritic debris resting on the sands and clays [of the plain] has, as the result of the partial removal of the uncompacted underlying deposits [along the valley sides?] given rise to a variety of caves, besides causing many streams to follow underground courses of variable length." Some of the flood-plained rivers have developed "a wonderfully complex series of meanders, the outer turns of which are vigorously undercutting the terraces," and thus widening the flood plains.

In their lower courses the rivers have repeatedly cut through the coastal-plain strata, so that they "strike boldly across the broader outcrops of softer and harder rocks," mostly schists and gneisses; and thus superposed they have cut rock-walled gorges, sometimes with incised meanders. Here they flow in "an almost continuous series of rapids and steep cascades," the last one of which defines the head of tide. "In all cases the waterfall is aligned parallel to the foliation of the crystalline rocks." The remaining tidal portions of the rivers "generally follow a very winding and complex course . . . lined by a broad fringe of mangrove swamp . . . across the low-lying coastal belt . . . for a distance of 25 to 30 or even 40 miles." Many short tidal creeks open into estuaries that are wider than the mouths of the main rivers.

The Coast. The margin of the lowest and latest-emerged part of the coastal plain is much modified by wave action. To the northwest of the colony-peninsula, the edge of the plain is suffering rapid abrasion on its moderate salients, where the retreat of the bare cliffs, from 40 to 50 feet high and capped with a crust of laterite, is so rapid that trees may be seen perched on the cliff edge or lying on the beach below; native villages are from time to time compelled to withdraw from the retreating cliff top, to avoid being undercut and destroyed. At low tide the extensive flats of an abraded platform are laid bare, interrupted here and there by small residual islands of laterite or cemented sands. Between the clift salients are prograded beaches, sometimes enclosing lagoons, back of which an abandoned and tree-covered cliff rises to the plain level. A large part of the longer stretch of the coast southeast of the colony is fronted by long and broad stranded plains, corrugated with sand ridges, overgrown with palms and patches of bush, and sometimes separated by shallow lagoons from the coastal plain, which is there cut back in cliffs 10 or 15 feet in height. The best harbor is that of the colonial capital, Freetown, at the northwest end of the mountainous peninsula; yet even there large vessels cannot reach the shore, but must unload and load their cargoes by lighters and barges. The bold peninsula consists of gabbro. Its base is encircled by a low and narrow coastal plain; a number of benches on its slopes are ascribed to abrasion during upheaval, and thus seem to correspond to the platforms and lower plateaus farther inland. A railway, after running 40 miles eastward from Freetown over the lower plain, branches into two lines, one of which runs northward and the other eastward to the base of the highlands in the northwest and southeast of the protectorate. Transportation elsewhere is mostly by paths and porters.

Comments by the Reviewer. The reader of an article on a region to him unknown cannot judge directly as to the accuracy of the observations on which it is based, but he may form a very definite opinion as to whether the article is intelligible or not. He does this by constructing a mental picture of the region as he reads; and if, at the end, the picture of the region is clear and coherent, he feels that the article describing it is well prepared, and he is thereby inclined to believe that the observations and interpretations on which the article is based were correctly made. One seldom finds a better illustration of all this than in the article which is summarized in the foregoing pages, for to the reader its excellence lies clearly in its intelligibility. The author has taken pains to describe explicitly and rather minutely the various land forms that he has seen in his explorations, and his description is so readily understood that the reader has little trouble in acquiring a clear conception of the region concerned. It might seem that the preparation of such a description should offer no great difficulty if the land forms have been actually seen; but as a matter of fact, regional descriptions are seldom so easily intelligible as this one: either the facts have not been clearly seen if they have been looked at, or if seen they have not been stated explicitly enough to make them easily understood.

Furthermore, the author does not limit himself to giving an empirical account of what he has seen; he goes further by supplementing his empirical account of plateaus and platforms, scarps and valleys, by offering explanatory suggestions as to their origin, and thus aids the reader to conceive the facts by describing them doubly. A certain smooth surface is not only a plain, but a flood plain; a certain narrow, rock-walled passage is not only a river gorge, but the gorge of a superposed river, with rapids in its incised meandering course. This is like defining the position of a point by observing its bearing from two or more stations. Moreover, the descriptions are frequently couched in modern explanatory terms, thus avoiding old-fashioned paraphrases: one reads, for example, of superimposed drainage, of the maturity and rejuvenation of opposite us, the cliff wall beginning at Bow Peak supports the Crowfoot glacier, while further north the Bow icefall breaks through between St. Nicholas and Portal peaks.

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By WILLIAM MORRIS DAVIS.
HARVARD UNIVERSITY

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"The scarps of the various plateaux show very great variety in their state of preservation; some of them are still bold and rocky, following sinuous and indented courses, while others are so who love the combination of mountain and desert, and to this I promptly set out. Eleven of the miles were traversed in a heavy wagon. Then we packed our belongings on the backs of the two horses that had drawn us thus far and proceeded on foot up the green cañon ahead. Half way to our destination we came across an old Irish miner, who lives alone and has been hammering away at the rocks for years, always expecting to find gold. We became "borrowers of the night for a dark hour or twain" and reached our cabin by moonlight. It was in a beautiful little valley more than a mile above the sea, and it looked very picturesque, but the oaks and pines surrounding it looked more interesting, and so I slept under the stars.

Monument peak, 6321 feet above the sea, could probably have been reached in an hour or two the next morning, although there is no trail, but Mr. Marshall, one of the owners of the Ranch, wanted to show us everything and so we went the longest way, stopping at two lonely ranches. The cattle stared at us as though they were unused to strangers. At one ranch, in a homemade kennel, was a young pet coyote, who vigorously protested against having his photograph taken. At a spring near the other ranch we stopped for lunch. The springs determine the location of the cabins and are not numerous. First some nearby campers came to get water, then the dog, then a hen leading her brood of chicks, and at various intervals there followed a blue jay, a pair of chickadees, a horse and a pair of mules. Had we stayed we surely would have become acquainted with all of the life of the surrounding country.

The climb, when we reached our mountain, was through manzanita, greasewood and other low but unyielding growths, that are prejudicial to wearing apparel. From the top is a scene of wonderful variety. Where else can mountains, desert and sea all be viewed? To the north were San Jacinto and San Gorgonio, the highest mountains of southern California, in the south the mountains of old Mexico, and in the west, beyond the nearby dark green mountains, the fog bank that hung over the Pacific Ocean, less than forty miles away, but it was the view to the east I had come to see, the view out over the Colorado Desert. The only plant life in all that vast expanse was cactus. The Salton Sea was light blue under the afternoon sun, while the desert itself was made up of etheral amethysts, violets, and mauves. The view was fascinating, haunting, but impossible to photograph. I had never before realized the limitations of a camera so much. Only an artist can do justice to such a view. We stayed on the summit until the afternoon shadows began to lengthen and then returned to the log cabin. How I longed for my sleeping bag and a chance to watch the sunset, the twilight deepen into night, the starlight over the desert, and sunrise next morning!

My journey from Monument Peak to the higher peaks that I could see in the north was a roundabout and warm one. When I say that I looked down 11,000 feet from a mountain 10,800 feet high it may seem like stretching the long bow, but that is what I did from the top of Mt. San Jacinto. The starting point for the climb is Strawberry Valley, where, a little over a mile above the sea-level, there is a comfortable tent camp, a store, and a post-office called Idyllwild, reached by automobile stage from Hemet. I proposed to camp as high as I could, and leaving immediately after breakfast, in four hours reached Hidden Lake, a little tarn about 9000 feet above the sea. Near the farther side is one of the best views of the Colorado Desert, so my companion and I stopped an hour, where we could look straight into Tarquitz Cañon, beyond which was Palm Cañon and the Salton Sea, the latter two hundred feet below sea-level. Then we pushed on over some more of the meandering trails that characterize the region and in an hour came to the upper end of Round Meadow, where under some fir trees of goodly size we prepared to spend the night at about 9300 feet. On the way we saw three deer. After a rest we left the trail to find a place where we could enjoy the sunset color over the desert. Perched on the rough crags we watched not only the beautiful coloring, but also saw the shadow of the big mountain we were on creep out over the sands and the full moon come up. A bluejay scolded us and a chipmunk made a few unintelligible remarks, while a small bird perched quietly on the top of a lone tree nearby was apparently like us, watching the sunset, but the cold prevented lingering and we hurried back to our camp, ate our "frugal evening meal," and before eight o'clock were wrapped in our blankets, looking out upon the brilliant moonlit night.

At 4.20 the next morning (it was August 24) we crawled out into the cold and in a few minutes were on our way, breakfastless, to the summit of Mt. San Jacinto, which we reached at six o'clock to find two others ahead of us. They had slept within a few feet of the top. We saw the sun rise over the desert, just before five o'clock, while we were still climbing. For a few minutes there was a beautiful pink color, then it faded and only a prosaic haze remained. Lodge pole vines in scattered ranks grew practically to the top. The undergrowth was principally chinquapin, and lupines were the commonest flowers, though there was more or less Indian paint-brush in bloom. These two flowers seem to grow on all the high mountains of western America. Lower down, perhaps a thousand feet, were fir trees and low manzanita.

On our return we went through Willow Valley, which proved to be a veritable flower garden, thanks to the unusual moisture. The first thing to attract our attention was a group of Mariposa lilies, of a beautiful violet color, then came quantities of lupine pink instead of blue. Thirdly there was a large canary yellow lily that was new to me. The Indian paint-brush was there in profusion and there were wild geranium, yellow mimulus, blue star grass and I know not how many more beautiful flowers.

Before the afternoon had waned I was back at Idyllwild and the next morning the automobile stage carried me from the comfortable "mile high resort among the pines" down to the orange groves and the heat of Hemet again, and my desert experiences were over.

In the cooler half of the year it is possible to be on more intimate terms with the desert, but in summer it is more pleasureable to look down upon it from the mountain tops.

GEOGRAPHIC NEWS AND NOTES

The following geographers were elected honorary members of the Hungarian Geographical Society at its 50th anniversary meeting in Budapest in May, 1922. MM. de Margerie (Paris), Mackinder (Oxford), Hellmann (Berlin), Beltram y Rozpide (Madrid), Machatschek (Prague), Marinelli (Florence), Lawrence Martin (Washington), and the presidents of the Spanish and Italian geographical societies.

Colonel Martin is a corresponding member of the Geographical Society of Philadelphia, and has received the *Malte Brun* gold medal from the *Societe de Géographie de Paris;* he has been, since before the war, an honorary member of the Geographical Society of Vienna, and the Appalachian Mountain Club. He carried on glacier studies in Alaska for several years for the National Geographic Society, and is a member of the Association of American Geographers, a member of the International Committee on Glaciers, and a Contributing Editor of the "Geographical Review" of the American Geographical Society. In 1916 he gave the Heilprin Memorial Lecture before the Geographical Society of Philadelphia.

Roald Amundsen, who last summer left Nome on a Polar expedition, has been halted by ice and is in winter quarters at Wainwright, on the Arctic Ocean, seventy-five miles southeast of Point Barrow, according to the last communications received from him.

The Petrograd Geological Committee has informed Norway that it has received advices from Dickson Island, Northern Siberia, of the finding of the diaries and other belongings of Knudsen and Tessem, two members of the Amundsen expeditions, lost during the explorations in the winter of 1919.

Early in September, the schooner "Bowdoin," carrying the members of the MacMillan Baffin Land expedition, arrived safely in Booth Bay Harbor, Maine. MacMillan and his crew were in good health and were well satisfied with the results of the expedition. The Philadelphia Geographical Society will be addressed by Capt. MacMillan, at the meeting of February, 1923.

The Schooner "Teddy Bear" sent out by Stefansson to rescue the members of his party whom he left on Wrangell Island, has been caught in the ice, and during the latter part of September, was sighted drifting in a northwesterly direction off the Siberian coast.

The explorer was much concerned about the situation of the three white men and party of Eskimos on board. As to the four white men and Eskimos from his expedition, left on Wrangell Island, he said they were well stocked with ammunition with which to obtain food.

Enos Mills, author and naturalist, died at his home at Longs Peak, on September 21st. He was fifty-two years old. Mr. Mills was familiarly known as the "Father of Rocky Mountain National Park." He conducted Longs Peak Inn, known to tourists throughout the country, and was the author of many books dealing with wild life. Chief among his publications are "Wild Life in the Rockies," "In Beaver World," "The Story of a Thousand Year Pine," "The Grizzly, Our Greatest Wild Animal," and "Watched by Wild Animals."

Brigadier-General Mitchell, Assistant Chief of United States Air Service, on October 18th, set an official world's record for speed, when he flew over a one-kilometer course at an average speed of 224.05 miles per hour. the record was made during the speed tests at Mount Clemens, Mich. The former record, recognized by the *Federation Aeronautique Internationale,* was made last year in France by Sadi Lecointe, who attained 205 miles per hour.

The Second Mt. Everest Expedition, whose British members have now returned to England, has the distinction of having broken the world's record for altitude attained on the surface of the earth. The route from the North Col, prospected by the 1921 explorers, was followed during the season just passed. On May 21st, Mallory, Somervell, and Norton reached an aneroid elevation of 26,800 ft.; Perhaps 500 feet below the north-east shoulder of the mountain.

On May 26th, Finch, Bruce, and a Gurkha N. C. O., using oxygen, attained 27,000 feet, on the North Face.

There is every hope of sending out one more expedition. If this is held over until 1924, it will allow time for a careful selection of equipment and permit the personnel to obtain training in winter snow conditions in the Alps.

The Society will be addressed by Mr. G. Leigh Mallory, of the Everest Expedition, on a date which will be announced.

Professor Emanuel de Margerie, the distinguished Director of the Geological Survey of Alsace and Lorraine, is representing France as exchange professor in this country during the present winter. At the University of Pennsylvania, on December 6th, Professor De Margerie delivers a lecture on "France's Contribution to Geology and Geography in the Last Hundred Years"—to be followed by a series of technical lectures at the same institution.

BOOK REVIEWS

Van Dyke, John C. *The Open Spaces. Incidents of Nights and Days Under the Blue Sky.*[1] Pp. 272, with frontispiece. New York, Charles Scribner's Sons, 1922.

A lover of Nature from boyhood, Mr. Van Dyke has spent much time in the open and describes with vivid touch the lure of the wild, before the march of civilization produced the many changes which he regrets. He recommends out-door life, both day and night, to familiarize one with the nocturnal habits of animals, and to foster feelings of confidence and safety on the wide prairie, beneath the stars, which one never gains when protected by burglar-proof houses.

On horseback, in canoe, on ranches with cowboys of a bygone day, in mountain regions, in desert spaces seeking water for man and horse and dog, he wandered far and wide for health and information, and, being a close observer, he has recorded his experience in detail to give pleasure and helpful suggestions to the reader who may contemplate following in his footsteps.

Fishing, hunting, shooting, in this country and abroad all hold added charms and incidents of these sports are related in Professor Van Dyke's characteristic style which all of his readers enjoy and appreciate.

LAURA BELL.

Huntington, Ellsworth, and Williams, Frank E. *Business Geography.* Pp. 482, with 97 figures. New York, John Wiley and Sons, Inc., 1922. Price $2.75.

Business Geography for High School and Freshman Courses. This book gives a thorough grounding in the various principles of Geography that affect business and our every-day lives, and shows the practical application of these principles in the various geographic regions of the world, emphasis being laid on the United States. A thorough statement of principles plus real, sound, practical applications is given, and questions the business man would ask are answered in language the student understands. Many problems are given, accompanied by a unique and comprehensive series of statistical tables. These tables are the first of their kind to make the basic facts of business easily available for the making of maps.

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[1] Obtained through membership in the Associated Mountaineering Clubs of North America.

Eaton, Walter Pritchard. *Skyline Camps.*[1] Pp. 245, with 18 full page illustrations from photographs. W. A. Wilde Co., 1922.

This is the Note Book of a wanderer in our north-western mountains. It should be read by the fire-side, when vacation time is over and one would enrich his own memory with the experiences of another. Eaton is a true nature lover; a careful observer who describes in entrancing fashion those little details of trail life which only the old-timer is able to recognize and interpret. Birds, trees and flowers are his specialties; he can paint a word-picture of an alpine meadow so that one can almost see the colors. True, he has given us two short poems in *vers libre,* but they are well overshadowed by the cliffs, below which he wrote. Eaton has decided but repressed opinions as to the intelligence of the pack-horse, with which we silently agree. We are not so sure of his mountaineering technique when we find the leader of his party holding an alpenstock in his right hand, and, with a little scout ax in his left, cutting steps up a fifty (?) degree snow slope. And the statement that Mt. Jefferson is the "second most difficult climb" in the United States, is a broad one. But, after all the most important thing, Eaton has a splendid time and writes of his wanderings in a way that makes us want to start along after him.

The book is divided into main sections:—Glacier Park, Lake Chelan, The Appalachian Trail, Crater Lake, Mount Jefferson, Sentinels of the Sage, and The Columbia Highway. The illustrations, by Fred Kiser, are adequate and admirable, not the least striking showing a pack-train crossing a long snow slope near Gunsight Pass.

J. M. T.

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[1] Obtained through membership in the Associated Mountaineering Clubs of North America.

ACTIVITIES OF THE SOCIETY

AIR POWER. MILITARY AERONAUTICS AT THE PRESENT TIME

BRIGADIER-GENERAL MITCHELL

On Wednesday, November 1st, the Society was addressed by General Mitchell, Assistant Chief of Army Air Service, and holder of the official world's record for speed. General Mitchell outlined the progress of American aviation since the war, and, with a series of slides, illustrated the developments which had been possible through use of old war material. The work of mail pilots, the manner in which England's formidable air force dominated the Turks in the recent Near East hostilities, the bombing of condemned battleships off Cape Hatteras last year, and the recent speed contests in Detroit were described.

General Mitchell, who was chief in command of all American aerial units at Chateau Thierry and of the First and Second Army in the Argonne, mentioned many phases of aviation pointing to the greater efficiency which aircraft is attaining. In the spring, a continuous air-mail service will be inaugurated between New York and San Francisco, the flying time to be twenty-seven hours. The destruction of navies by the hydrostatic pressure created by depth bombs exploding at a distance, is now a feasible exploit; the new 4000-pound bomb will lift a first-class battleship entirely out of the water. During the naval tests and the speed tests, not a single casualty occurred. The best flying rate during the war was about 180 miles an hour; the present world's record is 224 miles per hour. General Mitchell warmly advocates the centralization of transport to facilitate shipping of all kinds; railroad terminals should be connected with the steamer docks, with landing areas for aircraft either on top or close at hand.

THE WAY OF THE SPERM WHALER

ROBERT CUSHMAN MURPHY

On November 15th, the Society heard with no little pleasure the yarn of a sixteen thousand mile cruise in the brig "Daisy," one of the last of the square-rigged New Bedford whalers. During the course of the voyage twenty-seven whales were taken by means of harpoon, hand lance, and tackle similar to that employed by the Yankee whalers of years ago. Illustrations, in color, showed the taking of whales from the time a "spout" was sighted to the final consignment in oil casks. To those who love the sea, it is regretful that tall square-riggers with chantey-singing Yankee crews are now things of the past.

LOCAL EXCURSIONS

The first Autumn excursion took place on Saturday, October 28th. A goodly company of between fifty and sixty left the Society rooms at ten-thirty in the morning and proceeded by automobile to visit the Artist Colony at New Hope.

The route leads out Broad Street and Stenton Avenue to Willow Grove and Hatboro. Hills and valleys covered with beautiful autumn foliage passed in rapid succession, with Buckingham Mt. a most impressive view. At Inghamdale, the home of Mrs. Howard Knight, opposite Ingham Spring, a pause of an hour was made for lunch.

A short ride brought the party to New Hope, where the river road was taken to the canal. Leaving the automobiles, the members walked along the tow-path, stopping to see the collections of linens and hand-woven rugs in the studio of Mr. and Mrs. Davenport. A half-mile walk, under sunny sky, brought the party to a bridge and the Gothic Shop of Mr. Morgan Colt, where some wonderful metal work, as well as a fascinating house and garden, were inspected. The kindness of these artists in allowing their work to be viewed was much appreciated.

The return to Philadelphia was made over the same route, especially beautiful in the sunset lighting.

The second excursion was a walking trip through the upper Wissahickon. Owing to cloudy skies and uncertain weather, a small but interested party met at Allen's Lane. The walk was made down Cresheim Creek, passing the picturesque ruins of the Old Mill to the Devil's Pool, celebrated in Pemberton's story as the picnic ground of Peggy Chew and her friends. It is not the pool of those days, but it still has beauty and the walk upstream to Valley Green is always delightful.

The Excursion Committee is considering a program of winter walks and excursions, providing a sufficient number of Members desire them.

HELEN TUXBURY, *Chairman.*

NOTE: By an oversight the cover of last issue was numbered 3 and 4 instead of 2 and 3. This number is No. 4 of Vol. XX.

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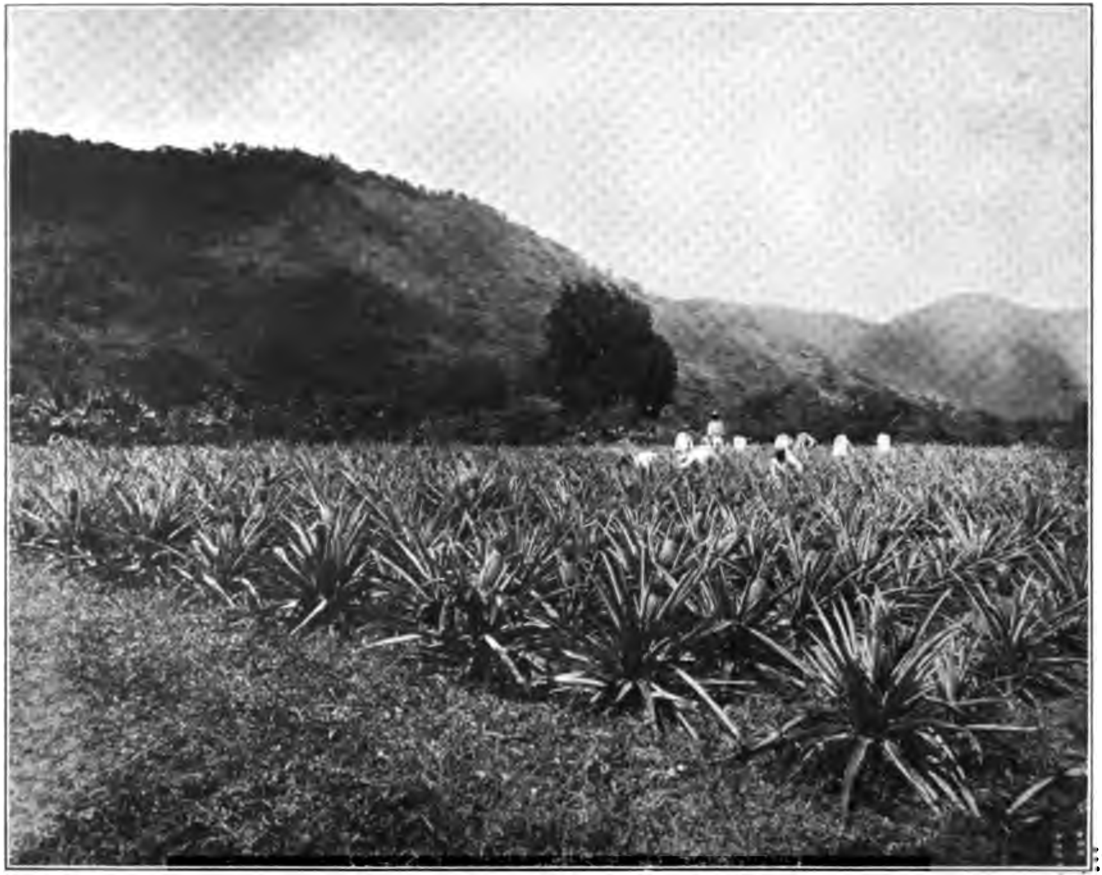

WORKING AMONG THE PINEAPPLES AT THE BOTANICAL STATION, TORTOLA

TORTOLA, THE CHIEF OF THE BRITISH VIRGIN ISLANDS

(Notes on a Forgotten Quaker Colony in the British West Indies)

CHARLES FRANCIS JENKINS

Extending down on the map from the Florida Keys, the Land's End of the United States, like some irregularly placed garden steps and stones, are the Greater and Lesser Antilles, making an almost continuous chain connecting North and South America, and enclosing the tropical garden of the Caribbean Sea.

First, there is a rather long stride to the largest island, Cuba, then a little lower and farther to the east, the frog-shaped island containing the black republics of Haiti and San Domingo. The third step in the same general direction and distance is to Porto Rico, for many years one of the Spanish pearls of the Antilles, now a part, but not a part, of the United States. Still another step down to the east and south and some fifty miles from Porto Rico, are the Virgin Islands, now divided in ownership between Great Britain and the United States. Here the Greater Antilles end and the Lesser Antilles begin.

Until the United States purchased the rights of Denmark in the West Indies, in 1917, the three most important islands, St. Thomas, St. John, and St. Croix, were known specifically as the Danish West Indies.

Ribald folks have a just saying that this group is indeed a holy one, composed exclusively of Saints and Virgins. Of the group, St. Thomas is the most important and best known, with Charlotte Amalie the capital town. But almost adjoining St. Thomas to the east, and within sight from its interior hill tops, is a group distinctively called the Virgin Islands. These were discovered by Columbus on his second voyage, in 1493, and it is thought, having been sighted on her saint day, Columbus named them in honor of St. Ursula and her fellow ten or eleven thousand martyred virgins. Other historians have suggested they were named by Sir Francis Drake in honor of Queen Elizabeth, while his ships lay in the harbor, since called the Bay of Sir Francis Drake, at the time he made his expedition against San Domingo in 1580. A native told me, however, that the islands took their name from an outstanding hilly island of the group, Virgin Gorda, which roughly resembles a woman of matronly proportions lying on her back in the water.

Of the scores of islets and rocks composing the British Virgin Islands, Tortola is the largest, being about twelve miles long and three wide at its broadest part, the total area being about twenty-one square miles. Its name means Land of the Turtle Dove, from the brown-colored doves which make their homes on the rocky hillsides. These doves are different in plumage and smaller than the turtle dove we know in the United States. On all sides of the Island, the land rises abruptly from the water's edge, the rugged hills seeming to come up out of the sea, the slopes covered to the summits with trees and undergrowth. These hillsides are cut by ravines and lagoons in every direction, so that the coastline is twenty miles or more from end to end of the island. The general effect of the group is that of a partly submerged volcanic mountain range, the higher peaks forming the larger islands, and the islets and detached rocks the lower summits. "She sits among the group of surrounding islets like a tall girl with her little brothers and sisters grouped around her," is the way an early visitor describes Tortola. The only settlement is Roadstown along the shores of Road Harbor, a deep bay on the southeast side of Tortola, and almost directly under Sage Mountain, the highest peak, which rises boldly 1650 feet in the air. Here the houses seem to cling desperately to the steeply rising hillside and there is barely room for the single street and its lining of buildings, which extends close along the shore. A little widening of the beach makes room for the market-place in front of the custom-house and here a rickety wharf runs out into the water, forming the principal landing-place.

Tortola was first owned by the Dutch, who are said to have built a fort there as early as 1648. It was taken from them by the English, recaptured by the French and Dutch, and finally retaken by a Colonel Stapleton, for England, in 1672. He demolished the fort, removed the guns and brought away about eighty subjects, Irish, English and Welsh, removing them to the more important colony of St. Christopher. The Virgin Islands then were regarded as of small importance, or none at all.

About the close of the seventeenth century, some English settlers, with their families, came from the comparatively nearby island of Anguilla, and made a permanent settlement. "This busy and industrious race of men," said Chief Justice Suckling, in 1870, "were not deterred by beholding the amazing craggy rocks and lowering mountains without one river, and very few springs of good water. In a few years, from the incessant toils of these people, cotton and sugar-cane might have been seen flourishing on the sides of the mountains and in the lowlands, ginger was cultivated and indigo works appeared."

In the days of the buccaneers and freebooters, these rocky islets and hidden bays and lagoons, with their dangerous reefs and shoals, furnished a safe hiding-place. The low-lying island, Anegada, is a veritable ships' graveyard. The great roadstead off Tortola, Sir Francis Drake's passage, was also called the Virgin's Gangway, and the names less sanctified than those applied by Columbus, given to some of the nearby islets, Rum Island, Beef Island, Dutchman's Cap, Dead Man's Chest, Prickly Pear and Broken Jerusalem, are reminiscent of the pirates and the buccaneers who frequented them.

It was on this rough, stony and religiously infertile soil, about the middle of the eighteenth century, that, like flames smothered in the ashes of the fireplace which sometimes relight and the newly-laid logs, a little congregation of the Society of Friends came into existence, carried on its work for a generation or more and finally passed away. While it existed, its importance and possibilities seem, at this distance, out of all proportion to the interest which it aroused throughout the Quaker borders, and to the care and effort bestowed upon it. Several prominent and valued Friends lost their lives in visiting the island and three of them are buried there. Itinerant ministers harkening to the call for service, came to it from England and the American Colonies and it was the fact that a venerated ancestor, with a concern to visit this little meeting, was taken ill on the voyage home to Pennsylvania, died and was buried at sea, that first aroused a boyish interest in Tortola. A visit to the Virgin Islands in 1913 further stimulated the desire to gather the facts that follow.

The year 1671 was memorable on account of the large number of ministers from the mother country who visited America. It was in this year that George Fox, with eleven more of the fathers and mothers of the church, for there were two women in the party, reached Barbadoes, having sailed from Gravesend in the yacht, "Industry," bound for America by way of the West Indies. They were chased by a pirate from the Barbary coast, which being a faster sailer, was ready to board them, but a cloud covering the moon and a fresh gale springing up enabled them to escape. They were seven weeks on the voyage, and on his arrival, George Fox was down with a fever, but meetings for church discipline were held in the house where he lay.

The passengers on the "Industry," called to different fields of religious labor, separated soon after their arrival in Barbadoes, some going to the neighboring Islands of Antigua and Jamaica and to Nevis, where they were not allowed to land.

On Barbadoes the Society grew rapidly, increasing by settlers from England and by convincements until it became an influential body of Friends. Five meeting-houses were built throughout the Island to accommodate the several hundred Friends. There was frequent communication by trading vessels with the American Colonies and many of our prominent settlers reached the American Colonies after varying lengths of stay in the West Indies.

In 1726, Joshua Fielding, with William Piggott, left England on a religious visit to the American continent. Joshua Fielding reported, with the exactness to be expected of a London merchant, to the Yearly Meeting, on his return in 1729, that he had traveled twenty-one thousand miles, to four hundred and eighty meetings in nine hundred and fifty-two days. In passing through the wilderness from South Carolina, he had journeyed alone several hundred miles through the forests with only a small pocket compass to guide him when the sun and stars were overcast.

It was in the course of this extensive and laborious journey, which covered all the British West Indies, that Joshua Fielding visited the Virgin Islands, and it was due to his labors and ministry that Quaker zeal was again kindled in the little spot in the Leeward Isles. He had arrived from the Island of Anguilla, stopping first at Spanishtown on Virgin Gorda Island, just across the bay from Tortola. Here the Governor lived at that time and Joshua Fielding reports large meetings at the Governor's house and elsewhere on the island. He then crossed over to Tortola, spending three weeks traveling up and down the island, and spent nearly five weeks in the Virgin group, leaving thence for St. John's, and St. Thomas which with true Quaker simplicity he calls John's. Island and Thomas' Island. He was detained in Jamaica by "ye hurricane," finally taking leave for Charlestown, S. C.

It is in a letter from John Pickering, some time lieutenant governor of Tortola, that we learn of the influences which caused the revival of Quakerism in Tortola. He wrote to London and Philadelphia asking for assistance.

While meetings were now being held regularly, as yet no outside Quakers had reached the groping little meeting. The island congregation deeply felt the need of advice on meeting organization and matters of discipline, so that about the time John Pickering was addressing a message to London, he forwarded a letter by his sloop to Friends in Philadelphia, telling of their situation and asking for assistance. "We should all be very much rejoyc'd to see a worthy good man of yt Profession in this Island," was the message. The receipt of this message sent a thrill through Quaker circles in Philadelphia. It was thought to be a manifestation of Divine mercy and favor. Some had felt that Quakerism was approaching its Dark Ages, but here was life in what had seemed a barren wilderness. Even a generation later they recalled the feeling of reverent thankfulness with which they had first heard the good news.

There came a prompt response. No one was better fitted for the task than that valiant minister and doughty sea captain, Thomas Chalkley. In the thirty years following 1707, when he made his first visit to the West Indies, he made upward of twenty-one voyages there. He knew the Islands, he knew of the people, and no one knew better than he the tides and winds and dangers of the journey. The average passage from Philadelphia to Barbadoes, with the little vessels of the period, was about thirty days; several of his voyages continued six weeks. Of a trip home in his own vessel, the "New Bristol Hope," in 1730, he says with pardonable pride, "the shortest from land to land that ever I had, 14 days and 14 hours." When the passage was smooth and comfortable he spent much time writing, thus preserving many intimate details of these mixed trading and preaching voyages. So great were his activities, one wonders if he were ever at his home meeting at

Frankford, near Philadelphia. His Journal is replete in details of social intercourse, appointed meetings, the sufferings of Friends and other Quaker matters, enlivened with adventures of storms, waterspouts, shipwreck, press gangs, piracy and the like perils of the sea.

It is no wonder that the Whittier family, sitting around the blazing hearth of the hill-hidden Massachusetts farm home, listened with absorbing interest to the evening reading by Abigail Whittier, from Snow Bound,

"Of Chalkley's Journal, old and quaint,
Gentlest of skippers, rare sea saint,
Who, when the dreary calms prevailed,
And water butt and bread cask failed,
And cruel, hungry eyes pursued,
His portly presence, mad for food,
With dark hints muttered under breath
Of casting lots for life or death,
Offered, if Heaven withheld supplies,
To be himself the sacrifice.
Then suddenly, as if to save
The good man from his living grave,
A ripple on the water grew,
A school of porpoise flashed in view.
"Take, eat," he said "and be content.
These fishes in my stead are sent
By Him who gave the tangled ram
To spare the child of Abraham."

This incident which Whittier has poetically paraphrased from the Journal, occurred on the homeward voyage in 1716, on the sloop Dora.

Thomas Chalkley, answering the call for help, left his country home in the sloop John, a trading boat belonging to Governor John Pickering, on the 19th of 7th Mo. 1741, and in nineteen days reached Tortola. John Pickering and his wife Dorcas saw the sloop as it hove in sight, at their home on the shore of Fat Hog Bay, and Chalkley continues: "They met me at the water side and Lovingly Embraced Me." He did not know as he stepped ashore that he was destined to end his days under the shade of the island's palm trees. It is from his own account of his voyage and labors, written at the time and found in a pocket of his coat, at his death a few weeks later, that a graphic account of his voyage and service has been preserved:

"We left the Capes the 23d, 7th Mo. and were Eighteen Days from Land to Land, falling in with the Island St. Thomas's one of the Virgin Islands, we turn'd up in one Day to Tortola, which made 19 Days in all in this Voyage. We saw Nine Sail of vessels, but spoke with None, had a Rough Passage, the wind being very high and contrary for above a week, and much Rain.

"We went ashore to the Governours house, where at our landing, the Governour John Pickering and his Spouse met me at the water side and Lovingly Embraced me and led me up to their house; where on the fifteenth of the month being the fifth day of the week, we had a large Satisfactory Meeting, at which were many people, and Divers not of our Profession."

"The First day of the Week, we had another Meeting larger than the former, altho that was accompted Large. The Governour told me he never Saw such a large Gathering on the Island on any Account."

Chalkley visited all parts of the Island continuing his labors for two weeks at the end of which time he found himself much indisposed—a hot fever upon him. This continued off and on for six days until he passed away the 4th day of the 9th Month, 1741, and was buried the same evening in Friends' burial ground at Fat Hog Bay, "accompanied to the grave by most friends and many others," is the comprehensive record. It was prophetic that he had concluded his last public sermon in the words of Paul, "I have fought a good fight, I have finished my course, I have kept the faith."

John Pickering had written that he found it a hard matter to be a Governor and a Christian in such a place as Tortola. In both his letters to London and Philadelphia, he told of the effort of the Governor of the Leeward Isles at Antigua, in whose care rested the administration of the Virgins, to remove him from the Lieutenant Governorship of the Island. The danger of attacks from the Spaniards then at war with Great Britain were real, Governor Matthew felt a sense of responsibility for the safety of Tortola, but as the Friends were incapable of engaging an enemy or using offensive weapons, he would be without excuse to His Majesty if the inhabitants in general should suffer through Governor Pickering continuing in office. He therefore asked him, notwithstanding his high personal regard for the Governor of Tortola, to resign, as they were now in actual war and danger, and he therefore commissioned Captain John Hunt, a "gentleman of worth and resolution, to succeed you in this troublesome post, as well as no salary or advantages."

The year following Chalkley's death, came John Estaugh and John Cadwallader from Philadelphia. Around John Estaugh, the halo of romance and poetry has gathered a store of intimacy and sympathy. Lydia Maria Child, in her "Youthful Emigrant," tells the story of Elizabeth Haddon, her coming to the new land as a girl of eighteen, the careful management of her father's considerable estate and her happy marriage with the young minister, John Estaugh. The poet Longfellow, in one of the best-known and best-liked Tales of a Wayside Inn, sympathetically continues the story of the religious services, proposal and marriage of John and Elizabeth Estaugh.

We recently celebrated the two hundredth anniversary of the founding of Haddonfield, N. J., and the building of the Estaugh home, some ten miles out from Philadelphia, where the pair of ancient yews, brought from England by the young mistress, were typical in their beauty and strength of John and Elizabeth Estaugh.

John Estaugh and John Cadwallader had both made former visits to the West Indies. They landed in Tortola the 8th of 9th Month, and were lovingly welcomed by Governor Pickering. John Cadwallader had been unwell on his arrival, he continued poorly, and in a little more than two weeks, he succumbed. Those attending his funeral were caught in a shower, from the effects of which John Estaugh was taken ill and soon died. John Pickering wrote the details of his closing days to Elizabeth Estaugh, patiently waiting in her pleasant home at Haddonfield.

In the minute book of Haddonfield Women's Monthly Meeting which Elizabeth Estaugh kept, as Clerk, for upward of fifty-five years, a model of neatness and precision, is a blank page, 165, between the entries of the meetings of 10th and 11th months, 1742. It was at this time she received word of her husband's death and burial in far-away Tortola. The blank page remains to this day, a touching tribute and mute token of her desolation.

John Cadwallader had been laid by the side of Thomas Chalkley, and John Estaugh requested that he should be placed on the other side of him. "These three valiants to be laid in the dust of our island has been very shocking to us," wrote the Tortola Friends to London Yearly Meeting.

It was several years after the death of these three prominent ministers before another came. In 1746, arrived Peter Fearon, a much-traveled minister from New Jersey and a neighbor of John Estaugh. He was in Barbadoes early in that year when a concern came upon him to visit Tortola. "He came in a needful time as a cloud full of rain upon a thirsty land."

So far, the visiting itinerant Friends had been men, but two earnest women from Pennsylvania about this time felt drawn to undertake the hazardous voyage to Tortola. They were Phebe Smith of Bucks County, and Mary Evans of Montgomery County in Pennsylvania, arrived 2d Mo. 14th, 1750, conducted by John Pickering, Jr., in his father's sloop. "They remained thirty-two days and had good service and went well away."

The two women Friends from Pennsylvania had hardly reached home when three prospective visitors sailed from Philadelphia for the West Indies with Tortola as one of their objectives. These were Peter Fearon, on his second visit, Thomas Lancaster, a minister from Richmond, Bucks County, and a business man of Philadelphia, John Bringhurst, who was making the voyage partly on account of his health. They reached Barbadoes late in August, and here John Bringhurst died at the home of the widow Oxley, in Bridgetown. It is a singular coincidence that the widow's husband, John Oxley, had died some years previously at John Bringhurst's house in Philadelphia.

Soon after the death of John Bringhurst, Thomas Lancaster and Peter Fearon took passage to Tortola where they labored earnestly about three weeks. They embarked for home, but shortly after they sailed, Thomas Lancaster was stricken with a fatal illness, died and was buried at sea.

A period of six years elapsed before another visiting Friend reached Tortola in the person of Thomas Gawthrop of Westmoreland, England. In early life he was a soldier in Cromwell's army. He made four voyages to the American Continent. One returning from the first in 1747, he was captured by a French privateer and carried into France. It was on his second visit, 1756-57, he visited the West Indies and Tortola.

From the days of Columbus, the West Indies and the Spanish Main had been harried by the contending navies of Europe, as war succeeded war. For two hundred years violence and disorder were the expected lot of the settlers in these parts. The keys and islets were the haunts of the so-called buccaneers, who made relentless war on Spain and all her settlements. Drake and Hawkins, Penn and Rodney, and scores of naval officers won fame and fortune fighting the Spanish, French and Dutch, through the Islands of the Caribbees. Slavers plied their trade industriously, pouring negroes into the islands. Every war brought its troop of privateers and privateering was but little more than piracy writ large, as Milton might have expressed it. About the time our little Island of Tortola was settled, Blackbeard, Sprigg, Avery, Captain Roberts, a host of lesser pirates made the seas unsafe throughout the islands and up the coast as far as Boston. The peaceful merchantmen viewed with fear and suspicion every approaching sail and were ready on the instant to take flight, or by superior speed, seek a place of refuge.

Throughout all these trying times, Tortola, while often alarmed, seems not to have actually suffered. On the breaking-out of the second war with France, a petition of some of the inhabitants of the Islands joined with English merchants concerned in the trade with Tortola, was sent to the authorities praying that a supply of cannon and ammunition might be sent them for their immediate defense. These forts, like all the stone houses in the Island, have long since fallen in decay.

In reporting to the Yearly Meeting of London, in 1748, Tortola Freinds stated that there had been many alarms, but the Island had been free from public molestation or great hurt. They expected to suffer from the late Act of Parliament requiring every family in the Islands to keep fire-arms in their homes and to respond to every alarm as well as an order by the Lieutenant Governor and his Council, to raise a great sum of money to build forts and towers.

Goldsmith's lines,

> "Ill fares the land, to hastening ills a prey,
> Where wealth accumulates, and men decay."

might have been written especially for Tortola.

The constant influx of slaves and the increasing production of sugar and cotton, sold at good prices, were pouring wealth into the Island. Gradually the cane-fields were extended and crept up the steep hillsides through laborious terracing by the toiling blacks. Toward the end of the eighteenth century, practically the whole island was under cultivation. The stony mountain roads, inaccessible for wheeled vehicles, were often blocked by trains of mules bearing casks of sugar suspended on long poles, between them front and back. Cotton and rum, the latter mostly shipped to the American Colonies, contributed their share of prosperity. Shipping and trade grew by leaps and bounds and the value of plantatons greatly increased.

Amidst this abounding wealth the little circle of Friends struggled to maintain its orderly existence, but even the elements made it hard to live regular and steadied lives. Hurricanes swept over the Islands and lesser tropical storms brought devastation in their wake. Occasionally an earthquake would spread terror, particularly among the blacks. Tortola seems not to have been more unhealthy than other West Indian islands, but sickness often prevailed and children of the well-to-do were sent at an early age to the homelands to be educated, often with too much money for their best welfare, and, in some cases, not seeing their parents until they reached manhood. Life, as a rule, was short and hot. Liquors were plentiful and in general use, with the burning sun taking its toll of the intemperate. A visitor some twenty years after Friends had disappeared, gives this dark picture of life on the Island at that time. He was the doctor in a slaver that had been wrecked in the West Indies, some of the slaves being sold at public auction in Tortola. He was contemplating marrying and settling there, but he says, "It is well nigh the most miserable, worst inhabited spot in all the British possessions; yet, although it *might* afford respectable employment to two medical men, no less than *six* are in competition for a practice here.

"From sunrise every face is important with business, real or pretended, until dinner-time, when the animal man is recruited at five o'clock. After this, the circulation of the wine-bottle occupies two or three hours of boisterous conviviality, followed—if it ceases then—by the quieter pursuits of gaming, cards or the dice-box. Late at night they retire to sleep off the effects of debauchery, and prepare for the same routine tomorrow. The softer sex, without whom society can hardly be said to exist, are in most circles altogether unknown; and no marvel, when we consider the paucity of their number. Tortola is supposed to contain eleven thousand inhabitants, at least nine hundred of them white people; a friend summed up the ladies now on the island, old and young, married and single, and they amounted to thirteen!"

Back and underneath these undermining causes were the sinister influences of slavery. If Governor Pickering exclaimed in despair, it was hard to be a governor and a Quaker, it was still harder to be a Quaker and a slave-holder. It was against these tremendous odds that the meeting struggled, its membership forming possibly a tenth of the total white population.

Reference has been made to the Island of Jose Van Dykes, which lay to the northwest and just off the shore of Tortola. Near Jose Van Dykes, were the still smaller islets of Little Van Dykes, Green Island and Sandy Island, all belonging to Edward Lettsom, at whose house it is probable a meeting was held at one time. Compared with these small keys, nearby and towering, Tortola seemed like a continent.

On Little Jose Van Dykes, was born November 22, 1744, John Coakley Lettsom, later to become the successor of Dr. John Fothergill, as the most distinguished London physician of his day. He is said to have been one of the seventh pair of boy twins born to his mother, of which number he and his brother, Edward, were the sole survivors. He was sent, as a boy of six, to Lancaster, England, to Abraham and Hutton Rawlinson, two brothers who carried on an extensive business with these islands, in the care of a friendly sea captain, William Lindo. They stopped at Dublin and no one thing impressed the little boy more than, to him, the strange sight of carriages in the streets and the ease and speed at which they moved.

He was placed at school at Penketh and at sixteen was made an apprentice to an apothecary, at Settle, in Yorkshire. Completing his first five happy years of apprenticeship at Settle, he spent a year at a hospital in London, and on October 8, 1767, sailed for Tortola, for the purpose of obtaining his inheritance, his father and elder brother having died. The voyage covered exactly two months. He found his patrimony much depleted, but one of his first acts was to free the slaves belonging to the estate, although the act left him "five hundred pounds worse than nothing." It should be recalled that this was long before the Society of Friends in England, as a body, was actively urging the abolition of slavery. He remained six months in Tortola practicing his profession, and so great was his popularity and skill that he acquired, in this short time, nearly 2000 pounds, half of which he gave to his mother, and with the other half he returned to England in July, 1768, and completed his medical education at Edinburgh. On Dr. Fothergill's death, he succeeded largely to his practice and in a lesser degree to the position the former held in religious, scientific and philanthropic circles. He was a man of broad sympathies and strong individualities; the "volatile Creole," he once called himself. Of him, this bit of doggerel was long remembered and still quoted:

I, John Lettsom,
Blisters, bleeds and sweats 'em.
If, after that, they please to die,
I, John Lettsom.

Dr. Lettsom was the correspondent and friend of many of the liberal minded, scientific and philanthropic. Formally received by the King on more than one occasion without the required court dress or sword, he dressed plainly and simply after the manner of Friends of the day. He enjoyed a tremendous practice, usually dined with his wife once a week, and spent the time in his carriage, driving from patient to patient, in writing. He was the author of many medical treatises and the editor of the three-volume editions of Memoirs of his friend and patron, John Fothergill.

Among the active early members of the Tortola Meeting, had been William Thornton. He had come out from England and married a sister of the second wife of John Pickering. His sons, Edward and William, had been sent to Lancaster, England, to be educated. Edward died in 1781, and William became a druggist's clerk at Ulverstone, studied medicine at Edinburgh, became the friend and warm admirer of his fellow Tortolian, Dr. Lettsom, and, like him, was filled with zeal for the enslaved Africans. Completing his studies, he returned to Tortola, but in 1786, coming to Philadelphia as a young man, with an ample fortune, he was fired with a desire to transport the free blacks of the north as well as the seventy or more slaves which had come to him by inheritance on his Tortola plantation, to their native homes in Africa. Such a plan had been discussed for some time by English philanthropists, including Fothergill and Lettsom, and one or more ill-fated expeditions sailed from England for Sierra Leone. Dr. William Thornton desired to lead such an expedition personally and wrote repeatedly from America, begging Lettsom's advice and assistance in the undertaking.

But Dr. Lettsom dissuaded him from the Sierra Leone adventure. He advised him to return to Tortola, make himself independent, and he then could do as he pleased.

Thornton traveled to New England, furthering his plan of repatriating the blacks. He married in Philadelphia and he and his young bride sailed three days later to Tortola on their wedding trip. Dr. Thornton, though entirely untrained, had considerable skill as an architect.

The new Capitol of the young republic was then in course of building, and President Washington was deeply interested in the plans for the city which bears his name. In March, 1792, while Thornton was still in Tortola, Thomas Jefferson, Secretary of State, wrote an advertisement asking for plans for the President's house and the Capitol, which the Commissioners actually in charge of building the city placed in the newspapers of the country. Dr. Thornton heard of it in Tortola, decided to compete, immediately proceeded with his designs and wrote asking permission to submit plans. When he reached Philadelphia, the competition was closed, but none of the fourteen drawings submitted were satisfactory, and Thornton took his plan to Washington, still at the temporary capitol in Philadelphia, who was greatly pleased with it and gave him a letter to the Commissioners urging them to consider it. The upshot was that Thornton's plan was accepted and the Capitol building, probably the best-known and most imposing structure in America, was erected substantially in his plans. "Grandeur, simplicity and Convenience appear to be well combined in the plan of Dr. Thornton," wrote Washington, while Jefferson, who himself was no mean architect, described the plan as "simple, noble, beautiful and excellently arranged."

For his plan of the Capitol, Thornton received the prize of $500.00 and one of the 100 Pound city lots in the new city. Thornton became the friend of Washington, was made one of the three commissioners for building the city and in 1802 was made the first Commissioner of Patents, which position he held until his death in 1828. He was the organizer of this important branch of Governmental work. Several beautiful buildings in Washington still stand to testify to his taste and untaught architectural genius.

Throughout Tortola, as everywhere in the West Indies, slavery was universal. The estimated number of blacks in the Island about the time we are considering, 1740-1760, was at least ten thousand. The slave trade was bringing wealth to the wharves of Liverpool, Bristol and London, and, in an almost equal degree, Newport, Salem and Boston in the Colonies. The West Indian Islands were the principal market for these human chattels. Ships sailing for the Guinea coast brought their loads of stolen, manacled and suffering blacks to be sold in the principal slave centers, and to be further distributed among the smaller islands. Black folks had no souls except in the Catholic Islands, and Friends had been severly punished for allowing them to attend meetings in Barbadoes.

But already, here and there, little candle-lights of protest were burning in the darkness. The agitation in the Society of Friends for the abolition of human slavery, begun in America by the little meeting of German Friends in my home town in 1688, was carried on through the succeeding years by Ralph Sandiford, Benjamin Lay, Anthony Benezet, John Woolman and others. The importing and buying of negroes was made a matter of discipline in Philadelphia Yearly Meeting in 1754, an dthe agitation against owning slaves became more and more active and earnest.

There is little information as to the treatment of slaves in Tortola. While Dr. Lettsom was on the island, he was sent for by a hard-hearted master to cut off the leg of a negro who had run away and been recaptured. It is needless to say how greatly he was shocked. We have seen how John Pickering's slaves mourned his death. The case of Arthur Hodge of Tortola, an educated, wealthy planter, a little later became a *cause célèbre*. He was hanged for the murder of a slave who had run away, whom he had beaten so unmercifully that he died. It was shown at his trial this was a common practice.

In 1802, but a few years before its abolition, there were 155 vessels engaged in the slave trade, capable of carrying 40,000 blacks, four-fifths of which went to the British West Indies. In 1803, a ship load of slaves arrived in Tortola and were publicly auctioned off to the planters.

Our Abolition Society, uniting the efforts of Friends and others, was formed in 1774, and its English counterpart ten years later, when Clarkson and others, building on the firm foundation which Friends in England had laid, began the agitation which in but little more than twenty years forced Parliament to pass the first act prohibiting the slave trade in 1807.

In 1839 three Philadelphia Friends visited Tortola to observe the effect of the emancipation of the slaves effected by the British Government.

So far as I have been able to ascertain, this was the last visit to Friends, until some seventy years later, the writer and his eldest son journeyed to Tortola to see if there might be any trraces left of the little meeting. This was in March, 1913. Taking the comfortable steamer from New York, in five days we landed at St. Thomas. Selecting a little motor-boat, The Rest, belonging to a Moravian missionary, and with an ancient colored man for pilot, of whom the captain's first eager inquiry was, as he came aboard, "Is Tobey drunk or sober?" we shipped out of St. Thomas in the darkness at 3 A. M., to take advantage of the tides. Tobey proved to be a competent pilot and steered by the stars and the dark headlands of the little islands. We had hoped to reach Roadstown by breakfast time, but head winds and a heavy sea compelled us to put in at Frenchman's Bay, on the southwest tip of the Island. All travelers who have mentioned it, speak of the discomfort of this short but strenuous trip in the swift currents that sweep through the Virgins.

We landed at daybreak at Soper's Hole, which is said to have been the unhealthy site of the original settlement in Tortola. In company with numerous natives bringing their produce from nearby islands, we waited until nearly eight at the custom-house, for the arrival of the customs officer, Mr. Smith, so that we might pay the sevenpence admission tax. The customs officer had as buttons on his waistcoat, old Tortola sliver pieces, which used to pass as sixpences, being two-shilling Spanish coins, but in quarters. Roadstown was ten miles away, over a rough and winding road, so procuring two horses we started for the capitol, piloted by two young colored men named Hodge. The road skirted the shore, then climbed over two mountain ranges with magnificent views. As we jogged along, the island seemed almost uncultivated. Here and there a colored farmer was working his cotton and one, with whom we chatted over his tumbledown fence, showed us the cotton bolls ready for picking, but stained and spoiled by the red spider that was discoloring it. It was a hard, hot ride over a rocky, difficult road. Our two boys took off their shoes so the rough going over the sharp stones would not scuffle them, their feet being tougher than their Sunday shoes. They took turns in carrying the heavy bag on their heads. A great thirst consumed us, but we were afraid to drink of the wayside wells, so one of the boys skinned up a cocoanut tree, detached a dozen and hammered them open with his big knife.

We passed numerous ruined sugar-mills and everywhere were evidences of a bygone prosperity. Nearing Roadstown, the boys stopped to put on their shoes to present a creditable appearance as we came into the town.

Our first duty was to call on the Commissioner, Leslie Jarvis, and as we entered his office in the Custom House and were announced, he walked over to his outgoing mail-box, took out an official letter and handed it to us. Some months before, I had written for some information, and, being a little slow in replying, he was able to deliver his answer in person, and thus save some postage. He received us very cordially, said he knew nothing about Quakers in the Island, and as there were no hotels or boarding houses in Roadstown, he found rooms for us with Captain Tittley, the Commander of the Tortolian navy—the Lady Constance, the thirty-ton mail schooner and supply boat. We called on the Doctor, drank tea with him, visited the agricultural station, where they are trying hard to reintroduce some of the early agricultural activities. But Tortola had sadly fallen from her days of prosperity and plenty. Only thirty-three whites were living on the Island with about 4200 black and colored. On Jos Vandykes there was but a single white, and in the whole Virgins, but a total of 5562.

W. C. Fishlock, of the Experiment Station, was doing his best to revive cotton growing by planting Sea Isle cotton. He was encouraging the planting of limes, cocoanuts and pineapples. But Tortola's commerce today is practically nil, the islanders growing enough for their own use and not much more. To bring in some outside money, Mrs. Jarvis had started lace making among the women and had aroused some interest in the work. But everywhere were ruined stone houses, unroofed by some former hurricane, broken arches of one-time big estates tumbled by earthquakes, and evidences on all sides of a departed prosperity. The inhabitants were living in small frame or thatch cottages, many with the corrugated iron roof so common in the tropics.

The next morning we were wakened by the cooing of the turtle doves on the hillside, which rose sharply back of the house. We had planned an expedition to Fat Hog Bay and sailing seemed the better way after the experience of the day before with the island roads. So, Mrs. Tittley packed our lunch and we started on what proved a rough and uncomfortable sail on the current swift Virgins' Gangway. To add to the discomfort of the trip, the younger of two colored brothers was the captain and his older brother the crew. As every time we tacked against the strong trade wind, the crew had to go down in the hold in his bare feet and shift the cobblestone ballast, he objected unpleasantly. I am convinced the rights of primogeniture should prevail on the high seas, if not on land. We approached the bay with an increasing interest. The boat could not go in to land so the captain and crew carried us ashore on their backs.

The first effort was to find the ruins of the meeting-house and the graves we were after. But none of the nearby white people had apparently ever heard of them or of the Quakers who once loomed so large at Fat Hog Bay. We finally found a colored family who knew where they were, and Rosanna, a dusky Amazon, offered to pilot us. Through the dense underbrush and over-growing trees, we followed a crooked cow-path and at last came to the hallowed spot.

The foundation of the meeting-house was there as well as the ruins of the graves of Chalkley, Cadwallader and Estaugh. But alas, they had been built of brick and as all natives need brick to build fireplaces, they had helped themselves from time to time so that some of them were level with the ground and the others crumbling with decay. Nor was it possible to absolutely determine which grave was which. Originally the names had been placed on the brickwork by brass letters, but these had long before been carried off by the natives to make the names for their sailing boats, and it is possible that some of the brass-lettered names we saw at Roadstown were made from the names of the Quaker preachers. So dense was the prickly pear and other thorny undergrowth that it was difficult to get around, nor was it possible, on account of the shade, to take a satisfactory picture—ruin and desolation and rough nature struggling as only it can, in the tropics, to reclaim her own. Taking one more brick from the tomb, supposedly Chalkley's, as a memento, we sought a nearby house to eat our lunch. This proved to be the home of Aeneas Pickering,.who welcomed us, placed his living room at our disposal, and was genuinely glad to see us and talk to us as we pulled our tough chicken to pieces and ate our lukewarm melon. He knew who and what Quakers were. He did not know who were his ancestors, but, from his name and location, he undoubtedly was descended from one of John Pickering's slaves.

The prospect of a return voyage to Roadstown in the sloop of discord, and over the rough waters of Sir Francis Drake's Channel, was so painful that we divided forces and Dr. Clark, who had kindly accompanied us, and I, secured horses from Aeneas Pickering and rode back home. The rough trail led over the hills seven miles to Roadstown. On the outskirts of Roadstown, the Doctor discovered a poor leprous woman who had stolen in, against explicit orders, for a glimpse of the village life. She sat by the roadside with her ancient and infirm father, an object of pity as the Doctor sternly ordered her to go back to her distant home.

We dined with the Governor on our return. We talked of his efforts to revive the prosperity of Tortola. He was much interested in the details of our trip, and when he understood how these deserted graves and this ruined meeting-house were in a way historic landmarks of Tortola's greatness, he agreed to have the place put in order, a new fence built around the spot and an effort made to stop the advances of the thorny jungle. But I fear this has never been done, knowing, as I do, the difficulties of doing it.

Mrs. Jarvis had, with true hospitality, and traditional information that Americans must have ice-water, sent the Lady Constance twenty-five miles back to St. Thomas for some ice. Head winds made it a slow journey, and, as we left our courteous hosts, we encountered in the dark two colored men with boxes of ice on their heads. As we were ready to blow out our candles for the night, there was a knock at the door and the messengers had arrived with a generous lump of ice in a cracker box, to help assuage our thirst.

Early next morning we boarded our little sloop, cleared from the customs-house, and started back to St. Thomas. Sailing out of Roadstown, a heavy shower swept over us, leaving behind, as it cleared away, a rainbow with its arch over the little town nestling under the hillside of the turtle doves.

A recent letter from the present Commissioner would indicate that since our visit in 1913 considerable improvement is to be noted in Tortola. He writes: "Dilapidated ruins have been renovated and many new dwelling houses erected. A market-place has been laid out in Roadstown. Improved roads have been constructed. Street lamps have been erected in the main street in Roadstown. A cricket-ground and race-course have been laid out on a five-acre recreation ground affording much recreation for the young folk. A bandstand is also erected at the grounds. A bonded warehouse has been erected and the matter of enlarging this building, compatible with increased trade, is now under consideration. A small hospital is now in course of erection. A library consisting of some 200 or more up-to-date novels has been established. A Peasants' Agricultural Bank has also been established. This has proved itself a great blessing to the peasant inhabitants. Money is loaned at reasonable rates on good securities. A motor-boat service has been established. A 13-tone launch capable of carrying thirty or more passengers with five tons of cargo carries the mails to and from St. Thomas. The journey to and from St. Thomas by sailing sloop is thus made less tedious."

NEW YORK TO MEXICO CITY—A JOURNEY OF CONTRASTS

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The Ward Line steamer left New York one Saturday afternoon in June scheduled to arrive in Havana the following Tuesday. While the boat would be crowded, on its northbound trip, with vacationists to the States, it was the off season for southbound tourists, so there was plenty of space for the ninety-five first-class passengers, and for the one hundred and fifty Chinese coolies, shipped from Canada in bond, who occupied only one corner of the large lower-deck bunk rooms. They were on their way to join the large numbers of their countrymen, who do the big week's washing for tropical Havana, raise most of its scanty supply of home-grown fresh vegetables and peddle fruit and pastry on its streets from wire-screened boxes skillfully balanced on their heads.

At this season the ocean is calm and much of the time there was hardly a ripple on the surface. The steamer followed the Florida coast so closely that a fine view could be had of Palm Beach; the air had gradually become warmer and the passengers who had staterooms on the east, or Trade Wind side of the boat, were to be congratulated. In crossing the Gulf Stream flying fish and porpoises are abundant. The low rounded hills of Matanzas indicate the approach to Cuba, and as the steamer nears Havana the white stucco buildings of that water-front city rise like a bare limestone cliff. Soon the cliff appears to be honeycombed; an effect produced by the typical two-storied buildings with pillars and porticoes of the first story and long French doors of the second story. The latter are kept shut in the daytime but opened at night to let in the cool ocean breeze. Soon the steamer is passing through the floating refuse from the city. Morro Castle and its lighthouse seem a part of the coral limestone cliff upon which they are built. This ancient fort satisfies the imagination and vividly suggests the romance of Spanish colonial days. The sudden approach to this city rising almost out of the sea, with its strange architecture and picturesque location, produces an almost magical effect. The boat seems to be heading directly for the building crowded shore, but suddenly the narrow entrance of the extensive pouch-shaped harbor opens to view. The conspicuous dome that at once attracts attention is not the Capitol building but the new President's Palace which suggests a country, in whose politics the individual is often more important than the institution. The boat passes the narrow fort-guarded entrance and soon is at the dock.

Havana, with its 360,000 people, is the only large city of the West Indies and the commercial, social and political metropolis of Cuba. On landing, preconceived ideas of the leisurely moving tropics receive a jolt. Touring cars swarm in the narrow streets of the old section of the city which was once enclosed by walled fortifications. For twenty cents the driver will take you to any part of the downtown section. The speed at which he travels and the numerous near collisions are calculated to hold the attention of both the passenger and the pedestrian. The bob-tailed, two-pole street car, reminds one of the suburban trolley, but larger cars cannot turn the rectangular corners of the narrow streets and even then the car must often veer over to one curb to make the turn, the front fender sometimes sweeping the sidewalk. The congestion certainly needs the guiding hand of the efficient blue-clad police force. The people are surprisingly well dressed and look much like any crowd in our own cities. The prevailing, small, specialized shops are full of goods similar to our own stores and indicate that Cuba sells sugar and tobacco and buys almost everything she needs from abroad. Two things disappoint the tourist: the almost complete lack of any distinctive native goods in the stores and the small amount of English that is spoken or understood. The architecture is characterized by red tiled roofs and blank stucco walls broken by large iron-grill protected doors and windows. The doors are large enough to permit an automobile to be parked in the front hall and afford a glimpse of the attractive inner courtyards or patios. At night the open windows exhibit the show parlor with the ornate furniture, gilt mirrors, glass candelabra and family circle of chairs. The hotel bedroom has a ceiling from fifteen to twenty feet high, a bare tiled floor, an iron bed and large French windows. The absence of mosquito nets over the beds indicates that Havana is comparatively free from one tropical pest. The patios, the open portico cafés, the evening parade in the plazas give an outdoor effect and an adaptation to tropical conditions. The summer day is hot but not unendurable. Early in the morning there is little breeze, the sky is clear and the sun's heat is quickly felt. Toward noon the breeze increases, clouds gather and it frequently rains in the afternoon. The rain, however, is of short duration; it soon clears, grows cooler and the nights are generally comfortable. A stop-over in Havana gives a good picture of tropical island life, modified by marginal location and ocean influence. The population is predominantly of white Mediterranean racial stock, although approximately one-third of Cuba's three million people are classed as black.

A fair sample of the rather uniform rural conditions existing throughout the island can be secured by taking short trips within a fifty-mile radius of Havana. The characteristic elements of the landscape are the royal palm; the scattered palm-thatched "bohio" or small country house with its small banana grove, little garden and scantily clad children; the great fields of sugar-cane surrounding the sugar "Central" with its tall smokestack, its elaborate modern machinery, its cluster of well-built houses for its trained technical staff and the sheet-iron or palm-thatch roofed cabins of its labor force. And finally there are great stretches of pasture land where big-horned oxen rest from the labor of pulling huge two-wheeled carts, when the winter cane-grinding season is over and the early summer rains make the roads well-nigh impassable.

From Cuba the tourist takes boat to continue the journey to Mexico. In two days the steamer reaches Progreso, the chief port of Yucatan and one of the three chief ports of Mexico. The boat is too large to reach the dock and must anchor about three miles off the flat white sandy shore. Huge sharks swim about the ship and are plainly visible in the clear water. Cargo is transferred by lighters. On approaching the shore ungainly pelicans can be seen swooping down to catch the small fish near the shore. One lands in a different world and a different civilization. The broad Indian faces of the common people testify that they are largely descendants of the Maya Indians, the founders of an early civilization long before the coming of the Spaniard. The port is only a small dusty town and the numerous windmills testify to the aridity of the region and the need to pump a water supply from shallow wells. On the docks are yellowish-white bales of Henequen fiber destined for the United States where they will furnish the chief supply of raw material for the binder twine needed for our grain harvests. Most of the plantations are within 100 miles of the coast. Merida is the chief city of Yucatan, and has an annual rainfall of 36 inches compared to only 17 inches at Progreso. The half-million people who live in Yucatan are isolated from the rest of Mexico and carry on their commerce by sea. They raise the one crop for export and must import practically everything else they need.

Returning to the steamer, another trip of about two days will bring one to Vera Cruz. Here one lands for the trip to Mexico City while the steamer goes on up the coast to Tampico, the commercial center of the great oilfields of Mexico.

Vera Cruz, since the days of the Spanish conquest by Cortez, has been the chief port of Mexico. From it, the old silver galleons sailed for Spain. In 1920, thirty-five per cent of the total value of Mexican imports entered the port and eight per cent of the export value left it. Other ports have surpassed it in export value, but it still remains the great highway of approach to the heart of Mexico—the densely populated plateau region of which Mexico City is the metropolis. Vera Cruz, now a city of about 80,000, is located in a flat sandy coastal region with some low sand-hills in the immediate background. In approaching the city the steamer enters a narrow opening in the extensive breakwaters of the artificial harbor which has been created at great expense. To the north are the lighthouse and the historic fortress of San Juan de Uloa. This fortress is built on a small island and was begun in 1528. It is reputed to have cost twenty million dollars. It is now used as a military prison and has an arsenal, dry dock, and shipyard connected with it.

Vera Cruz is a tropical lowland city, very hot and humid in the summer rainy season. It has a bad health reputation, but conditions have been much better since the sanitary improvements during the period of occupation by United States troops in 1914. The café tables set out on the sidewalks under the arched porticoes remind one of Havana. The markets are particularly notable for the variety of fish and tropical fruit and for the swarms of flies. There is a large Indian element in the population and, in contrast to Havana, the people are dirty and ill-clothed. There are swarms of venders and decrepit beggars. Black-headed vultures, "zopilotes," roost on the church tower and descend to raid the garbage wagons. After hastily viewing the city from the several excellent lines of street cars one is quite ready to go to the modern Union Railroad Station and start on the journey to Mexico City.

It is almost 300 miles from Vera Cruz to Mexico City—a wonderful trip full of scenic, historic and economic interest. The route is much the same as that taken by the Spanish conquerors under Cortez. It climbs from a low tropical plain through a semi-tropical valley region to a high, cool, 8000 foot plateau and illustrates a change in vegetation and products from tropical to temperate. The railroad was twenty years in building from 1854 to 1873. Before its completion the plateau people of Mexico were largely isolated from the world. On consulting the timetable, one finds that the train leaves Vera Cruz at six o'clock (6 A. M.) and arrives in Mexico City at two o'clock (8 P. M.) - the twenty-four hour time which is being used in several Latin American countries. The first-class fare is about $9.50 United States money and about one-half that for second-class fare.

Before the train starts, a detail of soldiers marches by and occupies a car behind the engine. On every train in Mexico a similar precautionary guard is found to prevent possible bandit hold-ups. Numerous crumbling blockhouses along the lines bear witness to a time when it was necessary to patrol the track and guard the bridges and tunnels to keep the railroad in operation. Trains were then only run in the daytime. On a line with so many bridges, curves and tunnels, it was an easy matter to wreck a train.

After leaving Vera Cruz the first fifty miles is through the coastal plain with a gradual rise in elevation to 1500 feet at Paso Del Macho. There is little to indicate the tropics in this region. It is a broadly rolling country with a scanty vegetation of scrub bushes and small trees. There are no large towns along the railroad. The villages are small and made up of crude palm-thatched huts. A few groves of banana and mango trees and some patches of corn are the chief signs of cultivation. Near the foot of the plateau there are more surface-rock outcrops, apparently of sandstone and conglomerate.

Throughout the trip across the coastal plain, the dominating feature of the landscape is the distant plateau front rising abruptly 7000 feet above the plain with the great snow-capped peak of Mount Orizaba towering above it. This cone-shaped volcanic mountain is the highest in Mexico, rising to 18,200 feet.

When the train enters the valleys, which the heavy rains have scooped out of this great plateau edge, it is like entering another world. From 2000 to 5000 feet elevation is a typical sample of the coffee zone of the tropics. Good rainfall, well-drained slopes, and fertile volcanic soil explain the abundant vegetation and dense population. Extensive sugar-cane fields occupy the flat valley lands. The scattered palm-thatched huts, each with its banana grove and corn patch, often climb up the fertile slopes. Some of the farms seem to be almost perpendicular. Every little hollow between the shoulders of the mountain has its tiny farm. On approaching Cordoba and Orizaba, the low red-berried coffee bushes, shaded by taller banana trees, and still other tall trees rising high above the bananas, make a three-storied jungle which presents a truly tropical appearance.

The city of Orizaba, at 4000 feet elevation, has a population of 40,000 and is the chief metropolis of this region. Its halfway location and cool nights, even in summer, mark it as a summer resort for the hot lowlands and as a winter resort for the high cool plateau. A delightful hotel with a tropical patio, good meals and rates fifty per cent cheaper than those in Cuba, make it a pleasant stop for tourists. The numerous churches with mozaic-tile domes give a picturesque air to the city in its hill-surrounded valley. A huge market-place is full of tropical fruits and attractive native goods. At night the throngs of blanket-clad Indians in the plaza give an interesting contrast to the well-dressed crowds in Cuba, but suggest watching from the side lines rather than walking with the throng. In the suburbs of the city are several large well-equipped cotton mills, receiving their power from a great 30,000 H. P. hydro-electric plant located near the top of the plateau.

Tiny mule-drawn tram cars connect the town with the railroad station and one leaves Orizaba with a feeling of regret and a determination to return some day. The extra engine that is attached to the train indicates that the real climb is about to begin. Many of the passengers are laden wth huge baskets of tropical fruit (bananas, oranges, mangoes, pineapples) which they are taking up to their friends in the high plateau. This is a reminder of the extensive local trade between the tropical lowlands and the highlands with their temperate zone products.

The coffee and banana groves are soon left behind. Deep gorges, rock cuts, tunnels and retaining walls become frequent. Oaks and pines begin to appear on the slopes. Many valleys open out with innumerable small coves bordered by ribbed hills. Gangs of Indians are at work cultivating with ox-teams or hoeing the extensive cornfields. Scattered houses disappear. Everyone seems to live in the little towns with their adobe-walled houses with red-tile roofs. At the stations throngs of bare-footed, long-skirted Indian women sell fried chicken, tortillas, peaches, grapes and various native drinks to the passengers. Soon the train is laboring up the steep grade. The last three thousand feet means a twenty-mile climb, taking two hours. When the brakeman wishes to reach the rear of the train he simply drops off and then climbs on the last car as it slowly passes. The mongrel dogs from the last station have no difficulty in following the train for miles to snap up refuse from the lunches of passengers, as it is thrown out of the car-windows. As the train curves around the mountain-sides, frequent views of the last small town can be had in its valley setting, an almost sheer drop of 3000 feet below.

At last the train reaches the plateau at Boca del Monte. The extra engine is taken off and the 200-mile journey across the high 8000-foot plateau begins. Looking backward, the western side of Mount Orizaba is in view. The air feels chilly and all the car-windows are soon closed. This new region of the high plateau has a few characteristic elements in its scenery which soon become monotonous. The train passes from one long valley basin to another, over low divides. Low bare mountain-ranges everywhere limit the view. Vast fields of corn and beans suggest the two great national foods—the tortilla and the frijole. In places these crops are varied by great fields of barley and of a tall weedy-looking legume—the garbanzo or chick pea—which looks like a water-soaked nasturtium seed and furnishes a nutritious feeling but no tasting pleasure when eaten.

As the rainfall diminishes toward the west, signs of irrigation increase and the maguey occupies more of the land. Pulque, the national drink of Mexico, is made from this large member of the century plant family. Its productive life is short. After seven or eight years of growth the flower bud appears. It is cut off and for several months the liquid intended for the tall flower stalk is gathered daily, and then the life of the plant is ended. This plant generally occupies the drier edges of the valleys, but toward Mexico City (especially near Apam) it seems to occupy over one-third of the crop-area. The tree yucca, the giant prickly pear, the organ cactus and the mesquite tree suggest a land of scanty rainfall. The wares of the Indian women change to the typical high-plateau products—pulque, apples, pears, cherries and cheese.

There are few large towns. Small mule-car tram lines lead off from the railroad station to the distant villages and great ranch-houses which are generally located in the edges of the valleys. Each tiny town is marked by its white church-tower and dome. There are no scattered farmhouses for this is the land of the Pueblo. At the stations piles of pine wood and stacks of charcoal in bags are frequently seen. Occasional dots of smoke in the scantily forested mountain-slopes show the activity of the charcoal-burners, who are providing the fuel universally used for cooking in Mexico. A heavy afternoon rain and hail storm reminds one that this is the rainy season and the time which guide-books recommend as the best for travel in the plateau region in preference to the dry and dusty winds of winter. As darkness begins to fall the Indians drive their herds of vari-colored sheep, goats, mules and cattle toward the adobe-walled ranch-corrals.

At San Juan Teotihuacan, twenty-eight miles from Mexico City, we pass the most accessible of the ruins of the old Indian civilizations. The pre-historic city and the Pyramids of the Sun and the Moon can be easily visited.

The entrance to the Valley of Mexico is at its lowest point where the shallow salt waters of old Lake Texcoco have been largely drained by a great canal. Much of the land is either marshy or unusable because of alkalai. The garden lands of the valley lie at the foot of the hills back of Mexico City. Mexico City lies in a mountain-rimmed valley with an area of about 2000 square miles and with an elevation of 7500 to 8000 feet. To the southeast the snow-capped peak of Popocatepetl can be seen towering above the almost innumerable smaller volcanic cones that rim the valley. At this season of the year it rains frequently. Almost three-quarters of the annual rainfall of 23 inches falls in the months of June, July, August and September. The cooler climate permits the use of raincoats and at night a light overcoat is a necessity. The architecture has none of the open-air characteristics of the tropical lowlands.

The City is the capital and great commercial center of Mexico, and has a population of about 800,000. Outside of the wonderful National Museum, and the obvious Indian blood of its common people, there is little to suggest the ancient capital of the Aztecs. The old canals have been filled in and the lakes largely drained. Many of the early Spanish buildings, however, remain and the city is full of historic interest to the traveler. A wonderful view is obtained by climbing to the top of the towers of the Cathedral which rise 200 feet in the center of the city.

A blanket Indian, with his bare feet encased in crude leather sandals, gazing at an adding machine in a modern store-window typifies the strange contrast of the Old and the New which is the Mexico of today. The illiterate primitive Indian, the vast insanitary slum section of the city, the ill-lighted streets and the policeman with his lantern, the homeless sleepers in doorways and under benches, the older streets with rough cobblestone pavements, the bull-ring, the crude distribution of food, and the small shops where goods are purchased by individual bargaining—all are marks of the lag of civilization. Modern suburbs with fine houses, beautiful well-paved streets, fine parks, an interesting commercial museum, a relatively small but excellent modern business section, a few good hotels, a fine system of city and suburban trolley-lines, are some of the marks that indicate the rapid modern business progress of the country.

The New, one is apt to view critically; the Old, furnishes much of the picturesqueness and charm for the tourist. To one who visits Latin America for the first time, there is no other short and easily made trip which can compare in geographical variety, historical and economic interest with this journey to Mexico City.

MORRO CASTLE AND LIGHTHOUSE, HAVANA

TYPICAL COUNTRY HOUSE IN CUBA

MT ORIZABA, THE HIGHEST MOUNTAIN IN MEXICO

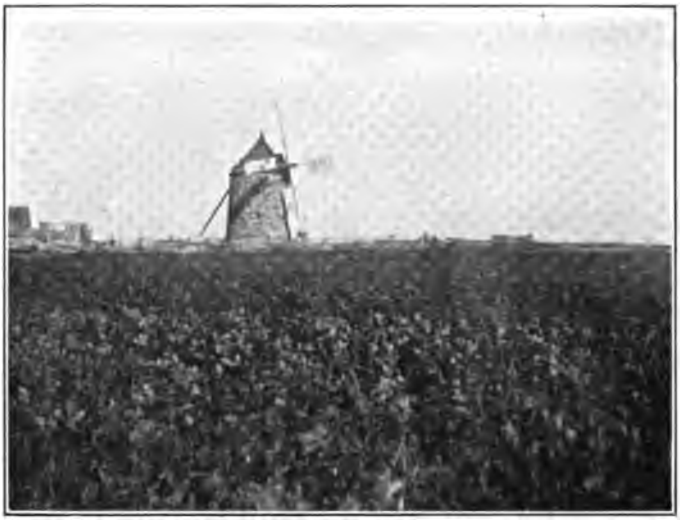

Figure 1.—The windmills of Isle Aux Coudres are set fixedly to the Southwest, so persistent is the wind in that direction. This old Norman mill is used for grinding grain.

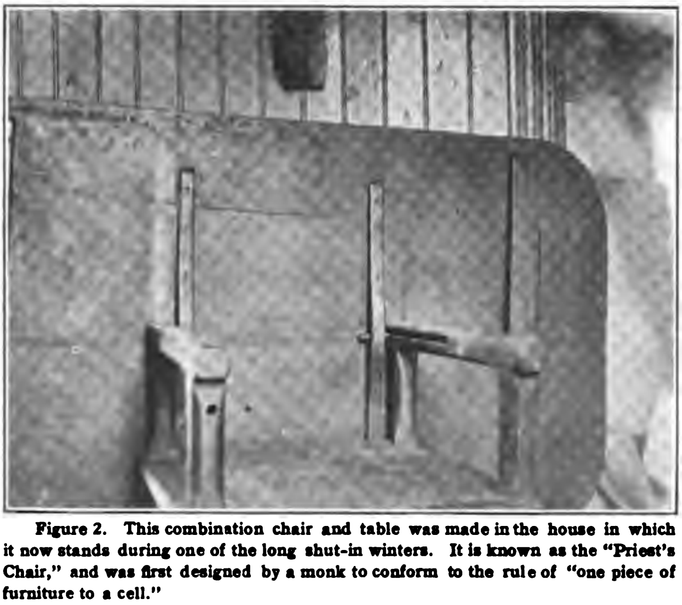

Figure 2. This combination chair and table was made in the house in which it now stands during one of the long shut-in winters. It is known as the "Priest's Chair," and was first designed by a monk to conform to the rule of "one piece of furniture to a cell."

CLIMATE IN THE LOWER ST. LAWRENCE VALLEY*

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The Elements Peter Parley was correct in stating in his "Geography" that "Quebec had the summer of Paris and the winter of St. Petersburg."[1] And furthermore he did well not to mention spring or fall. The winter is seven months long; the summer five. There is no transition. Generally the winters are long and cold and the summers short and warm. The precipitation is not heavy but it is always sufficient for the prosperity of plant life. Herbertson has typified it as "Laurentian" and compares it favorably with the climate of Amuria in eastern Siberia. Koppen,[2] in the latest and most comprehensive classification of climates, has put it in a province of the following characteristics: a cold climate with dry winters, with, however, sufficient preciptation at all times, and with temperatures that run from summer heat greater than 50 degrees Fahrenheit for one to four months, to winter cold not going below 6 degrees for the coldest month. Merriam[3] in his paper on the life-zones of North America notes that the mean annual temperature of the hottest six consecutive weeks is less than 64.4 degrees and places it in the "boreal" zone.

When Quebec is cold, it is very cold; when it is warm, plants flourish. Taking the growing season as the length of time between the first and last frost (mean annual), the period of plant growth is 124 days at Quebec and 97 days at Clarke City. Clarke City is a post situated just beyond the Pointe des Monts whose climatological record will but little exaggerate the climate of the northern extreme of the territory. The winter is so long and cold as to reduce the mean annual temperatures and the figures of 38.7 degrees at Quebec and 35.1 degrees at Father Point give a misleading idea of the warmth of the summer season. Quebec has a summer average of approximately 60 degrees and Father Point of 52 degrees.

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* The writer is indebted to Professor R. de C. Ward, under whose direction this article was written, and to the Canadian Meteorological Service, from whom valuable data were obtained.

Judging alone from the temperature-data one would immediately divide the region into two subdivisions, the purely continental section and the more distant section that is affected by a marine influence. Quebec and Father Point may be taken as the two representative stations of these subdivisions. They are, however, located at the western border of each section and report more favorably on the climate than is truthful, but they have longer climatological records. A brief examination of their temperatures shows that not only is the mean annual temperature of Father Point lower by 8 points than the same statistics for Quebec, but that the mean annual range of the seaward portion is also less than that of the inland section. The tempering influence of the waters of the estuary and gulf are not alone responsible for this; there must also be taken into consideration the heavy covering of snow that lies on the ground well into April and which holds the temperature down till after the sudden melting. This retardation is especially significant because in the short critical period in the spring it is at times difficult to plant in cold ground.

The precipitation is greatest in early and mid-summer. As with the temperature, the farther east one goes the later the maximum. There is no season that is excessively dry. Once the winter settles there is little melting and the snows thus are preserved as a heavy covering. On Ile aux Coudres just beyond the church of St. Louis the road which swings inconveniently around some meadows goes, in winter, directly across the fields because the fences are buried in the drifts. The mean annual snowfall will aggregate to a total of from 6 to 12 feet, and it is not uncommon for 5 or 6 feet of this to remain on the ground at a time. The distribution of precipitation is on the whole a happy one. The long snow-covering of five months is of such botanical importance that it can scarcely be underestimated. The plants and the roots are thus well covered and the ground is seldom frozen deeply. The lumber industry, also, is greatly facilitated, for it is during this period that logs are "snaked out" to the streams. The effect of this great coat that lies frozen on the lands, blocking the roads, fairly covering some of the cabins in the woods, has a blanketing effect not only upon the country-side and the habitations, but upon the mental and physical activities of the people. The spring is somewhat dry and the partial coincidence with the planting season is fortunate. Following this there is a wet growing season succeeded by a dryer harvest time, which is here about the end of July or the beginning of August. It is not until May that the trees bud, and in mid-September the greens give way to the incomparable scarlets and yellows of the Canadian autumns.

The control of the weather is decidedly cyclonic. The most persistent wind is the southwestern. We do not need a wind-rose to point this out to us when all travelers in the region must observe that wooden windmills are set fixedly toward the southwest. The habit of the wind is acquired not only from the prevailing continental tendency, but also the river channel must aid in directing it to this persistent direction. Especially on the upper estuary, the winds may change with the tides. (4, p. 343.) In Quebec-Labrador there is a northeast wind that is very severe and that may hold for a week at a time. (5, p. 14.)

The Succession of the Seasons

Spring in the Lower St. Lawrence blooms suddenly and gloriously. As soon as the snows are off the ground (in Quebec this is in the beginning of April), the fields take on their first green, and develop quickly. The suddenness of the season is accompanied by a delightful lack of rain. Winter comes all the way to meet the summer, and summer is not shy. The foliage develops in a fortnight. (4, p. 337.) The summer heat is not oppressive before August, and in the north never is so. The heavy covering of winter snow prevents the ground from freezing deeply. The capuchin of winter is hardly cast aside before the farmer is bare-armed and bare-chested in the fields. At Betsiamis and beyond, the season is seriously retarded and the trees do not begin to bud until early June, nor is the ground warm enough for early planting. (5, p. 13.)

The rapidity of the approach of summer may be seen in the celerity with which the ice breaks up. About Quebec and the Ile d' Orleans the ice is thick enough to make a common roadway for man and beast. One may awake to find the firm ice of the day before now restless and dangerous. A few hours and the ice begins to disappear. Suddenly, with little warning, it is gone. To quote a typical example: on the 16th of April of a certain year it was safe for driving, on the 19th it could be used for walking only, by the 21st open spaces had appeared, and on the 24th canoes were being freely used on the water. (1, p. 5.)

The summer is blessed with a sufficiency of rain. With so short a summer the farmer must work with intense and unremitting energy. There is little social life other than that which the laborers enjoy in the fields. Winter comes all too soon. A single maple on the hill flies a scarlet signal and the country-side breaks forth in color. The harvest must be hastened, for shortly the snow advances and the world capitulates to winter.

The winter is severe. Throughout the western portions, however, the cold is dry and invigorating. In the woods the lumbermen wear two and three flannel shirts at a time and as many pairs of trousers. Without a wind a temperature of plus 10 degrees to minus 10 degrees is not uncomfortable. Most of the cabins are actually in the woods or at the edge of the forest and fuel may be found in the door-yard.

The most disagreeable part of the year is November, a cold and gloomy month. The temperature is low and the relative humidity high, causing sleet storms. I have wondered whether or not it were possible that many of the larger islands of the St. Lawrence were uninhabited because of the high sensible temperatures of the damp winter's winds directly from off the river, rather than because of the difficulties of communication. Sleighing in Lower Canada is said to be of five months' duration as against two in Upper Canada.

Shut in from the fields and prevented from taking long journeys, the people form themselves into social groups. In the evening but one in two fires is burning. People congregate at the home of friends. Neighbors visit neighbors and shake off the silence of the northern winter. But these pleasure pilgrimages are short. There is but one journey that may be of length. This is taken, surely, by every well member of the family. The curé may look over his flock on a Sunday morning to find them all present. There is no one more devout than the French Canadian. Not only doees he go to the church, but he brings the church back to his home. What the priest forbids does not, with certain human exceptions, happen. Amusements are heavily censored. The cinema is not generally desired in Lower Canada and, therefore, does not exist. The joy of dancing is a forbidden one. The French Canadian, of our region, therefore does not dance. I will not say that he never dances. I have heard of cabins that the priest is not likely to visit through the winter storms and to which he is not invited while the fiddles are there. Here young feet and old beat to the rhythm of music.

A more intimate and far-reaching consequence of the winter is felt in the increased family consciousness. It is developed here to a degree that could hardly be expected in warmer climates. We are assured by Cooley (6, p. 107) that within the narrow circle of a snow-bound family there "is a vivid interchange of thought and feeling, a sphere of real unity, of sympathy, loyalty, honor, and congenial intercourse." Gunnar (7, 169-171) in speaking of Germanic origins, recalls how the winters of the north of Europe fostered the growth of sentiment, peace, good-will, the sense of honor, and loyalty to friend and kinsman.

An interesting phase of the winter is the home industry. Withheld as this energetic people is from their normal activities, they turn their ingenuity to craftsmanship. The tools of the farm are frequently home-made. Rakes, flails, gleaning-forks, pitch-forks, cradles, and handles of all sorts are turned out by these artisans. Also much of the furniture is home-made. This is perhaps more particularly true in the primitive farming communities. But the care with which this furniture is constructed, together with the artistry shown, gives evidence of more than casual craftsmanship and no sense of haste. An example is the desk with thirty-three drawers in the home of the *bedeau* on Ile aux Soudres, in which the wood was inlaid and all carefully matched.

Nor is it the men merely who are engaged in special winter duties. The loom which is taken apart in the summer months is brought down to the living-room and all day the shuttle is thrown and the batten brought down with a thud that jars the little cabin. The carding of the wool and the retting of the flax may be done in the summer or in the autumn, the spinning is done in those busy leisure moments of a woman's life during the four seasons of the year, but the weaving is a matter for the winter.

The seasons make their round quietly in French Canada. The brief periods of intoxication of spring and fall are sobered by the long winter of hibernation and the summer of industry. The Gallic enthusiasm of mind is refrigerated for seven months and during that time is under the careful tutelage of the Church. The forces of environment work slowly, but they grind exceedingly fine.

It is not difficult to fathom the philosophy of these people, and they would doubtless be the last to admit its complexity. It is based in tradition and in climate. No one has described it more admirably than Louis Héman. In *Maria Chapdelaine,* we have the simple story of a land characterized by—

> "The marvel of the reappearing earth in the springtime after the long months of winter . . . The dreaded snow stealing away in prankish rivulets down every slope; the tree-rootes at first resurgent, then the mosses drenched with wet, soon the ground freed from its burden whereon one treads with delighted glances and signs of happiness like the sick man who feels glad life returning to his veins . . . Later yet, the birches, alders, aspens swelling into bud; the laurel clothing itself in rosy bloom . . . The rough battle with the soil a seeming holiday to men no longer condemned to idleness; to draw the hard breath of toil from morn till eve a gracious favour.
>
> "We carried in our bosoms the hearts of the men of our fatherland, brave and merry, easily moved to pity as to laughter, of all human hearts the most human; nor have they changed. We traced the boundaries of a new continent, from Gaspé to Montreal, . . . in this land of Quebec nothing has changed. Nor shall anything change, for we are the pledge of it. And we have held fast, so that, it may be, many centuries hence, the world will look upon us and say: These people are of a race that knows not how to perish . . . We are a testimony."

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GEOGRAPHIC NEWS AND NOTES

Lord Carnarvon and Howard Carter, Egyptological excavators, have unearthed below the tomb of Rameses VI, near Luxor, two gorgeous rooms containing the funeral paraphernalia of King Tutankhamen, who reigned about 1350, B. C. The quantity of relics found is believed to exceed the capacity of the Cairo Museum and constitutes one of the great discoveries in the history of Egyptian art.

Dr. George Otis Smith has resigned the directorship of the United States Geological Survey, in order that he may qualify legally as a member of the United States Coal Commission. It is understood that the President hopes that Dr. Smith will be willing to resume his work as director of the survey when his service as a member of the coal commission terminates.

The American Alpine Club held its 21st Annual Meeting on Saturday, December 30, 1922, in the rooms of the Geographical Society of Philadelphia. The annual dinner followed at the Bellevue-Stratford Hotel, Mr. Donald MacMillan being present as guest of honor. Reports of mountaineering and exploration were made by members of the club, while Mr. MacMillan exhibited moving pictures made during his recent journey to Baffin Land.

A Double Tunnel under Mont Blanc has been planned by French and Italian engineers. It will be nearly nine miles long, entering Mont Blanc at Chamonix and emerging at Mont Chetif, in the valley of the River Dora, with seven short tunnels on the French side and six on the Italian side leading up to the main passage. The new tunnel will afford the shortest route between Paris and Milan and will compete with the Simplon route.

We learn from *Science* that an expedition to study seismic distrubances on the bed of the Pacific Ocean under the auspices of the Carnegie Institution of Washington and the Hydrographic Office of the Navy, will leave San Francisco in the near future. Two American destroyers, the *Hull* and the *Corry*, have been selected for the work. They will carry the sonic depth finder, by means of which it is hoped to make continuous soundings for 7000 miles along the Pacific coasts of the United States and Mexico. The soundings will be made on parallel lines, approximately at right angles to the 2000 fathom curve, at intervals of five to ten miles, extending from the coast to a point on the deeper floor of the Pacific Ocean. The expedition, through a more accurate charting of the bed of the Pacific Ocean, aims to throw new light on the causes and the effects of the seismic disturbances that so often occur off the Pacific Coast of North America.

Captain Roald Amundsen, who sailed in June from Seattle on the S.S. Maud on his polar expedition, arrived by dog-team at Nome, Alaska, on December 14th. Captain Amundsen "mushed" from Wainwright, near Point Barrou, where other members of his party are wintering.

The Hurley Expedition, which left Australia in August with a flying boat and seaplane to explore the country at the head of the Fly River, Papua, has had its plans dislocated by climatic conditions. The air pilot, who has reached Brisbane, reported that the machines were found unsuitable. Rain every night and terrific heat by day destroyed the fabric covering and made it unsafe to proceed. The only planes possible in such country must be of metal, with high horse-power.

Dr. G. B. Gordon, of the University Museum, has successfully negotiated with the British Museum for a joint expedition to Southern Mesopotamia for the conduct of archaeological investigations. The expedition left London on September 26th and will spend the winter in making excavations at Ur of the Chaldees.

BOOK REVIEWS

Faris, John T. *Seeing the Eastern States.* Pp. 244, with 92 photographic illustrations. J. B. Lippincott Co., Philadelphia, 1922. Price, $5.00.

This beautifully bound, illustrated and printed book is the fourth of the "Seeing" series. One marvels at the industry of the author in the appearance in rapid succession of these books, which have been instrumental in indicating to Americans the possibility of travel within the confines of their own country. By the Eastern States is meant those of New England and the Central Atlantic region (New York, New Jersey, Pennsylvania and Delaware). The main geographical, historical, scenic and legendary features of this region of America, noted for its natural grandeur, are dealt with in sufficient detail to stimulate the interest of the reader and to create a desire to travel and see these marvels at first hand.

J. W. H.

Bingham, Hiram. *Inca Land.* Explorations in the Highlands of Peru. Pp. 351, with 55 photographic illustrations, five maps and a bibliography. Houghton Mifflin, Boston, 1922. Price, $5.00.

A detailed account of archaeological expeditions conducted during 1911, 1912, and 1915, under the auspices of Yale University and the National Geographic Society.

During the first expedition, Mt. Coropuna was ascended. This peak figures on Raimondi's map (1865) as 6949 m., making it higher than Mt. Aconcagua, then conceded to be the highest peak of the Andes. While Mt. Coropuna eventually proved to be 21,703 feet, it is still higher than any peak in North America, and on its summit was placed the highest camp ever made in the Western Hemisphere.

Journeys to Parinacochas, the "Flamingo Lake" of the Incas, to Lake Titicaca, the Vilcanota country and the Huatanay valley, afford material for attractive descriptions of the topography and fauna encountered. At Cuzco, the oldest city of South America, the capitol of the *Conquistadores* under Pizarro, one enters upon a region which was the center of ancient Inca rule. The Peruvian Andes in this area reach their scenic climax in a great group of snow peaks, some of which exceed 19,000 feet.

Inca Manco, fleeing from Pizarro, crossed the Panticalla Pass to the Urubamba valley, an affluent of the Amazon, and there, in the interval 1536-72, established Machu Picchu, the "last city of the Incas." The historical outline and events leading to the rediscovery of this lost city, by Professor Bingham, fill many enjoyable pages with interest not often exceeded in fiction tales of pirate treasure. The extensive ruins are minutely described and adequately illustrated.

One cannot, however, put down the book without a feeling of childish disappointment that no great treasure of Inca gold was found; many a reader will be left wondering at the fate of it.

J. M. T.

Jeffers, LeRoy, A. C., F. R. G. S. *The Call of the Mountains.* Rambles Among the Mountains and Canyons of the United States and Canada. With illustrations. New York, Dodd, Mead & Co.

In perusing the pages of this book, one makes acquaintance with most of the regions which lay claim to scenic distinction in the United States and Canada. Chapters describe the author's adventures in climbing Mount Moran, one of the Teton group in Wyoming, rambles in Yellowstone and Glacier National Parks, the Oregon Coast, ascent of Mount Rainier and various climbs in the Canadian Rockies. After visiting the Rocky Mountains of Colorado and Mesa Verde National Park, five illuminating chapters are devoted to the mountains of California. Here Mr. Jeffers is at his best in depicting the charm of the deserts, the marvels of the Kings and Kern River regions and the lonely grandeur of the high Sierra.

While travelers from many lands have, like the author, stood enthralled on the brink of the Grand Canyon of the Colorado, a smaller company have visited the newest of our national parks at Zion Canyon and its neighbor, Bryce Canyon. If, however, we accept the dictum of our author, these newer playgrounds of the people, owing to variety of form and a richness of coloring unsurpassed in nature, are destined to become world-famous when they become more accessible and better known to the traveling public. Although identified with mountaineering in its more serious aspects, the author is not above devoting chapters to "strolls" upon the peaks of the White Mountains, the Adirondacks, the Southern Appalachians and a traverse of Mount Ktaadin.

While winter sports among the mountains have not attained the vogue in this country that they have reached in Europe, attention is called to the increasing number of enthusiasts who indulge in these health-giving pastimes at Lake Placid, Dartmouth College and the mountain resorts of the Middle and Far West.

In estimating an avowedly popular book such as this, it would not be profitable to hold the author to a strict adherence to the canons of the mountaineering craft in his various expeditions. One notes that many of the ascents were made in a hurried manner and without guide or companion. Doubtless this characteristic of his expeditions was not always of his own choosing; but the accounts of these solitary climbs, made in record time and sometimes after nightfall, will not commend themselves to trained Alpinists who believe in surrounding their sport with the safeguards which experience has dictated.

H. G. B.

ACTIVITIES OF THE SOCIETY

THE NEW TURK AND HIS NEIGHBORS

Dr. Herbert Adams Gibbons

In speaking before the Society on December 8th, Dr. Gibbons described the modern Turk and his neighbors as ignorant, indifferent and arrogant. They are interested in nothing outside of their own villages; many of the peasants have never heard of the Balkan War and know nothing of the World War. The country is in the hands of a group of unscrupulous politicians, and the attitude of the Near East toward us is one of entire indifference.

Asiatic life today is a challenge to the supremacy of the white man; a supremacy firmly held prior to the Japanese-Russian War, but since challenged by the many nationalist movements which attack our civilization, religion, and social codes. Dr. Gibbons declared that the Turks should be dealt with in somewhat the same manner as has been done with the Germans, and advocates for America a wider participation in world affairs. He predicts the scrapping of all five of the peace treaties made at the conclusion of the World War, if the Powers accept the revision of the Treaty of Sevres.

CHINA AND AMERICA TODAY

Dr. Edward H. Hume

Dr. Hume, General Secretary of Yale in China, addressed the Society on January 3rd. The lecture was an interesting review of the awakening of China and the great strides made during the past decade. Since the overthrow of the Manchu dynasty, in 1911, China has been rallying around individuals instead of unifying herself as a nation, and it is this which has caused most of the recent turmoil. The encouraging signs are an awakening interest in education, the teaching of health through the medium of clinics and associations, and the gradual eradication of old enchaining social influences and usages.

IN UNKNOWN BAFFIN LAND

Donald B. MacMillan

Although Baffin Land was discovered 346 years ago, not until 1921 had any white man ever penetrated to its unknown interior. Mr. MacMillan, lecturing before the Society on January 24th, described in graphic fashion the results of his latest expedition. It was discovered that the Magnetic Pole is not a point, as is the geographical North Pole, but an area some fifty miles in diameter, in the Boothia Felix Peninsula, 1200 miles south of the North Pole. This area moves westward at the rate of six minutes of longitude per year and will reverse its direction in about a century, a complete cycle taking approximately three hundred years. At the North Magnetic Pole, ordinary compass observations are useless; the needle points straight downward and north of the area, the compass points south.

In reaching this region, one sails above the level of the Aurora, so that the Northern Lights are in the south. For 274 days, the explorer with a crew of six, braved the ice-pack; the schooner "Bowdoin" was frozen in off the western coast of Baffin Land, where, during the winter, magnetic observations were made. The lecture was illustrated with slides and moving pictures showing life in the North.

LUNCHEON IN HONOR OF MR. G. H. LEIGH-MALLORY

On Saturday, January 27th, George Leigh-Mallory, one of the leaders of the attempt last year to scale Mount Everest, was the guest of honor at a luncheon given by the Geographical Society of Philadelphia at the Bellevue-Stratford Hotel.

Among those at the luncheon were Alba B. Johnson, Dr. R. Tait Mackenzie, Bishop Garland, ex-Ambassador Roland S. Morris, William H. Sinclair, British consul; Dr. Harry B. Nichols, president of the American Alpine Club; Dr. W. W. Keen and his daughter, Mrs. George W. Handy, and Henry G. Bryant, former president of the Geographical Society. A. H. Collins, president of the Society, was the toastmaster.

Dr. Nichols, hailing Mr. Mallory as the greatest mountaineer the Society had ever welcomed, greeted him with the tribute "from an older generation to a splendid type of the younger."

Mr. Mallory touched upon the various methods that had been suggested to reach the summit of Everest and the fallacy of thinking that it would be feasible to land an airplane on the peak, and briefly outlined the tremendous physical and natural obstacles that must be conquered.

Details of Mr. Mallory's lecture, entitled "Climbing Mt. Everest," have been reserved for the April BULLETIN.

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LAVA FLOW AND BROOK. UELAGE ASAU. SAVAII.

STREET SCENE IN WAISA. FIJI.

NATIVES BY A BAKA TREE. ISLAND OF KOROVAKU.

WHAT I SAW IN THE SOUTH SEAS

WILLIAM E. HUGHES, M.D.

It was the lure of the South Sea Islands that attracted us. Of course there was a vacation to be taken, and some place to be found in which to take it, still we had years ago read so much of the Cannibal Islands, and, in later years, wonder tales of the beautiful maidens and idyllic life, that there was every reason for going. We found that there was this much of truth in all these tales,—years ago the people really were cannibals.

Mr. A. S. Weill and Dr. R. N. Keely were with me. The trip is an easy and simple one nowadays and you do not need your private yacht; in fact, for a short trip such a yacht would be undesirable, almost a nuisance, and you could really see more without it. You might go as we did to Suva in the Fijis by the Canadian-Australasian Line, thence through the Tongan Islands on the Union S. S. Co. boat to Samoa and home to San Francisco by the Oceanic Line. If you would wish wilder life you could go on to Sydney, and taking a small boat from there, have all sorts of adventures, with the additional advantage that having returned you could tell any sort of stories, for none of your audience would have been there to contradict you.

When you land at Suva, our first stop, instead of a crowd of yelling cannibals you see a Carnegie Library and in a little open space next door to it a German gun captured on the Western Front. For these people were patriots, who, when the Mother Country was in danger, sent all of their best to her help and now have their trophies to show, although they do not talk much about them. Not far from the Carnegie Library is Dr. Lambert's office, an American physician sent out by the Rockefeller Foundation to combat the hookworm disease. All Fijians have hookworm and as they, in common with all partially civilized peoples, prefer their style of doctoring to that of the white man, it would look at first glance as though Dr. Lambert's job would be a very difficult one. But, on the contrary, it is surprisingly easy, for, among their superstitions, is a belief that most of their ills are due to snakes in their interiors. When he shows them the hookworms they spread the glad tidings and send all their relatives and friends for a spring house cleaning.

The Fijians are pure negroes, great upstanding fellows with wonderful muscular development. One thing among them strikes you forcibly, the generally finer development of the chiefs over the commoners. For generations the chiefs have been carefully bred and nurtured and the result is very apparent. The relationship of the classes to each other is impossible to understand clearly; there is a pure socialism, in that there is no individual ownership of property, mixed with an absolute monarchy, in that the chiefs had undisputed power even to life and death. Of course, the old relationship has been modified immensely by their government under the British Crown but even yet you can see constantly the remains of the attitude of instant obedience to the chiefs.

They have the true philosophy of life in one respect at least, they say: "Why should we work, we do not need the money it brings,"—and they don't work. Possibly the knowledge that if they did accumulate any money it would have to be given to the first friend who asked for it may have something to do with this attitude. To get labor on the sugar plantations, the most important industry on the Islands and one that has brought much wealth, Hindus were imported from India under indenture. This system worked many evils, as it has always done, but these were eventually corrected and the Indian's lot was certainly improved over the conditions in his home country. But discontent grew, as it is apparently growing all over the world, the Indians refuse to work on the sugar plantations, which consequently are being abandoned, and demand political and social equality. It was interesting to find these world problems working out even on a small scale in what was only a little while ago The Cannibal Islands.

The Fijians are thoroughly missionaryized. Whether this has caused any appreciable change in their character is at least doubtful, but it has given them an excuse for the boundless exercise of one of their best possessions—Song. Weill and I took a motor boat and went up the Rewa River. The rainfall in this part of the Islands is almost excessive; but we were exceptionally fortunate, in that it rained almost not at all during our month's stay there. As a result of the usual rainfall the rivers are large, the Rewa twisting and winding through a beautiful tropical country till we could go by boat up it a distance almost equal to the diameter of the Island. We got thus among the real native life, although still not the most primitive, as we found out afterward. There on a Sunday the day opened with a beating of lalis, hollowed out logs, that do duty as drums summoning the congregations. Not so many years ago these same lalis would have called to a cannibal feast. The boys certainly got a deal of pleasure out of the drumming and the noise was not wholly unmusical. It was an easy matter to get accommodations in any of the villages, the people were glad to see us for we were an interruption of their rather monotonous lives. The best house was always put at our disposal and the compensation was definitely fixed by the government. We liked these Fijian negroes rather better than the Polynesians of Tonga or Samoa, whom we saw later, but that might have been somewhat a matter of first impression. At any rate one can enjoy any of these peoples best if one can remember always that big-bodied and stalwart and grown up as they may seem, they are really children in mental development, then their vagaries and inconsistencies are of no moment. Many of the chiefs in Fiji have been educated in English colleges, but they are most of them still in many respects mental children.

One of our most delightful experiences was when we were entertained by Royalty, in the person of Ratu Pope, the grandson of the old Cannibal King Cakobau, who had ceded the Islands to England. He invited us to visit him at Bau, the old Cannibal capital, where he was Roko or Governor of a province. It is the policy of the British Government to appoint the descendants of the old chiefs Governors of Provinces and to hold them responsible. Bau is delightfully situated on a small island and is the usual collection of houses built of poles and thatched with leaves of the sugar cane. Today there is in the foundation of the missionary church a stone flecked with small particles of gold, which at one time was part of the old Fiji temple. Against this stone in the old days the heads of captives were dashed, thus converting them into fresh meat. Pope is an enthusiastic cricketer and is looking forward with great pleasure to the possibility of visiting Philadelphia, whose fame had extended that far as an important centre of cricket. He took us out fishing one day and while we were trying more or less successfully to land some of the brilliant colored and odd shaped fish, his men were on shore on a coral island thickly covered with cocoanut palms preparing a feast. Just as in the manner of a clam bake they made a bed of coals from cocoanut husks and on that heaped an octopus with yams and taro and breadfruit. It was a delightful feast with the octopus easily the best. Later we drifted lazily home, sailing in outrigger canoes through the golden sunset. These outrigger canoes are still much in use all through the south seas; they are seaworthy and safe and were at one time built of enormous size. When one couples their capabilities with the navigating instinct of the Polynesians, one can easily see how the Islands were peopled and how even the South American continent might have been reached.

That night Pope gave us a native feast of thirty-two courses, I am not sure of the exact number, but he told us thirty-two and there was certainly a lot of stuff. We sat around cross legged on the floor and the food was served us by beautiful maidens. That sounds well, but the photographs do not bear out the statement. I was guest of honor and was requested by Pope to be master of ceremonies and it was with most delicate and diplomatic skill that he guided my somewhat wobbly footsteps as a Fijian entertainer. Afterward we had Kava and a dance. This, the characteristic dance of the Fijis, is done by the women sitting down,—that is, it is a rhythmic movement of the body with waving of the arms in accompaniment to a song, each stanza of which ends in a peculiar expiratory grunt. After the dance Pope asked me to relate to his people some of my experiences in the Arctic while I was up with Peary hunting for the North Pole. He translated rapidly as I talked and the audience sat apparently spellbound, but they had been well trained and would not dare let their attention flicker while their chief talked. I have often wondered how much of it they really understood for they had never even seen ice or snow.

After leaving Bau we went on down the coast and finally succeeded, largely through the lucky meeting with two missionaries, in getting back into the hills among the more primitive natives. Fiji, or to speak more accurately Viti Levu, the largest island on which we spent most of our time, is a beautiful country of mountains. At one point on our ride inland we could look thirty-five miles across gorges and cliffs and rolling tops to the exquisite blue sea with its white coral islands. Far to the left the hills were green with trees, in front everything except along the rivers was brown, straight across the country, up hill, down valley, the dividing line ran, the green was the rainy country, the brown the semi-arid. The villages were less pretentious, the houses ran up to a point of thatch. The children fled at our approach but gathered to see us in the protection of their parents for we were the first tourists in their country. The people were dressed more as in the old times, and we wondered whether after all the much derided Mother Hubbard of the Missionaries did not have its advantages.

We heard a tale of bootlegging extraordinary. Mr. Baker fifty years ago had gone into the hills against the advice of those who knew conditions. Violating tabu after tabu he was finally killed, his body dismembered and apportioned among the neighboring villages, the village doing the killing retained his legs as an especial tidbit. The legs were encased in Wellington boots and the cook, not knowing anything about boots and missionaries and thinking that one was part of the other, put the legs in the boots on to cook. After a proper interval, thinking of course that they were thoroughly done, they were taken off the fire but were still too tough to carve. Then this process was repeated; at the end of three days an investigation was made, the boots taken off and the legs found to be really overdone. For quite a while this cooking was a standing joke in the neighboring villages. I asked an old man, whose beard like Aaron's ran down all over his chest, which part of a man was best. His eyes lighted up and he danced about flourishing a war club I had just bought. "No part best," he said, "All good." "Then which is best, a man or woman?" "Both good, all good." The war club, by the way, had a human tooth inset, showing that it had killed a victim; but the tooth looked suspiciously like that of an old woman rather than that of a warrior.

Just after nightfall we heard a girl's voice calling rather musically sentence after sentence; she was issuing orders to the villagers to guide them the next day, the man whose regular duty this was being absent in a neighboring village helping to build a house. The Tui or King was a benevolent looking old gentleman whose power was so absolute that even his wife obeys him. They readily consented to have their photographs taken, in fact we found everywhere this desire to be photographed; they seemed to get some physical satisfaction out of it for as the camera clicked, you could notice a little shiver of gratified expectation. The Princess Alice was a sprightly young damsel, who took great pride in some plaited ringlets hanging over her left ear, the symbol of virginity.

Finally we got back out of the hills to the coast and, as we were rowing along the edge of a mangrove swamp, we saw two women with some crabs they had caught. One of them came over to the boat after some coaxing, the other disappearing among the mangroves. After we had bought her crabs she explained her hesitation and the other one's flight by telling us she had always heard that Americans were devils, but, she added, now she knew they were angels. There is evidently a possibility of adding a silver lining to reputations.

That night we spent with Ratu Eppeli, the Roka of a province. He was a graduate of an English college with the best grasp of native affairs of any Fijian we had met, and yet he was willing to sell us mats. After the bargain had been concluded, and this was only after consultation with his wife, the sister of Ratu Pope, we added a small amount to the purchase price, telling him to buy something for his wife in remembrance of our visit. Instantly he handed us two more mats, saying "This is our loloma." He would not be outdone in generosity.

The Tongan Islanders are Polynesians with brown skins and straight or wavy, not crinkly, black hair and no suggestion of the negro. They have evidently a high appreciation of themselves for their theory is that God created first the Tongan, then the pig and finally the white man. These Islands are an independent monarchy and run their internal affairs pretty much themselves, with only an occasional suggestion from the British Crown. Every father, on the birth of a son, is compelled to set out ten acres of cocoanut palms into possession of which the boy comes on reaching the age of sixteen, thus insuring him a perpetual livelihood. This, with the constant discouragement of whites, leads to the universal prosperity which one notices. They are more thrifty too, I imagine, than most of the Polynesians. Thus the King could see no reason why monies collected by the missionaries should go out of the country to the parent Wesleyan church, so he started a church of his own and kept the cash at home.

One night we heard in this church the most magnificent choral singing it has ever been my pleasure to listen to. With no orchestral accompaniment, nothing but the beating of time by the conductor and an occasional verbal command, the service went on faultlessly for an hour. The men's voices were magnificent, better than the women's, and at times so deep toned that it sounded as though there must be an organ.

It was the old King who, at the beginning of the World War, cabled King George that Tonga would remain neutral. He lies buried in state. The sacred tree of Tonga, a wide spreading, symmetrical, magnificent tree guards the grave yards of the people, mounds of coral sand that are generally ornamented with symbols so emblematic of departed spirits,—empty beer bottles.

The Prince Consort, the husband of the reigning Queen, was on board the boat with us on the way to Samoa and was most entertaining and full of Tongan information. On the island near the capital is a huge monolithic gateway, the stones of which have been brought from another island quite some distance away. He told us this folk story. After the stones had been quarried, a canoe was built large enough to transport them, when it was found that the canoe was too heavy to launch. Whereupon one of the party, an enormously strong man, urinated and raised the sea so that the boat floated easily. He suggested that this might be a Tongan version of the flood myth.

As you enter the harbor at Apia in Samoa two things front you of world interest, the wreck of the German "See Adler" lying high on the reef, and the hill on which is the grave of Robert Louis Stevenson. You can easily see why the hurricane wrought such havoc, for the bottle shaped harbor made by its protecting reef is so placed that the seas poured directly into its mouth, overwhelming all but one of the war vessels gathered there. The Adler lies on its reef, a reminder of the time when, but for the tragedy of the hurricane, a world war might have been precipitated. Stevenson's grave is on a shoulder of the mountain, a thousand feet above the sea; all about in the woods the doves still coo his requiem. From it one looks down on one side to the red roofs of Apia and the beautiful blue of the sea marked with the white lines of the surf on the reefs, and on the other on the plantation which he cleared and where he lived, with the mountains rising beyond, tier on tier into the misty distance. Today his house is the official residence of Colonel Tate, the Governor of Western Samoa under the New Zealand mandate.

We heard few personal tales of Stevenson's life; the chiefs who were his friends are all dead.

Western Samoa composed of the Islands of Upolu and Savaii, with its capital at Apia, was formerly, after the national readjustments following the hurricane, German and was taken during the War by New Zealand, which now governs it. We have the other Island, Tutuila, with its capital Pango Pango. Weill and I wished very much to visit Savaii, the most primitive of the group, and where native life is least changed and here Colonel Tate was of invaluable assistance, getting us police permission and giving us a letter to Mr. Cooper, the local administrator. It is necessary, before visiting, to get a police permit. This we thought at first only an over-paternalism and an effort on the part of the government to show its authority; but, after we had visited the Island, we became easily convinced of the wisdom of the measure. Also we were impressed by the great interest the Government is taking in the Samoans and the good it is doing. Mr. Cooper continued Colonel Tate's kindness and he and Mrs. Cooper put us up at his residence as guests, a courtesy one appreciates highly, as there is no hotel on the Island. He mapped out our itinerary and sent letters ahead to the Pulinuus, chiefs officially in charge of a village, advising them of our coming. He must have said something very complimentary for we were received with every honor.

Savaii is a volcanic island with an active volcano and many lava flows of various ages, one of them only a few years old. At one place in it you may stand on the edge of a ragged well and look down on a grave bright with crotons and gay flowers. It is the grave of a Taupou or village virgin. These are selected, one in every village, from among the daughters of the chiefs for their wit and beauty. They are most highly respected, the most important woman in the village, guarded carefully, chaperoned everywhere. They entertain visitors, take an important place in the ceremonial dances and, in the old days, led the villagers to war. This virgin's grave was so sacred, the Samoans tell you, that the lava, instead of overwhelming it, flowed around it and left it with its flowers in the beautiful sunlight. The lava is rough and broken, like that in the crater of Kilauea on Hawaii, and footing it across is no easy task, but Samoan boys went over it easily in bare feet while our boots rapidly cut out.

On all the island there was not even a Ford. I had ridden in a Ford along the wonderful cryptomeria avenue from Nikko to Imaichi; in the interior of Venezuela had gone across country in a Ford, and could have reached Caracas, had I wished; once on the upper Amazon in Peru when my horse gave out I had pressed a Ford into service; and now in Savaii I must confess to rather a feeling of relief that I should have to depend on myself.

The lava is porous, hence there are few streams or springs, except along the coast, and one travelling in the interior has to depend on cocoanut milk. Fortunately the supply was large and so our afternoon teas were frequent. The second day out was rather the worst, the sun boiled down on the black, ragged lava with an intensity that made us imagine it was hot, so that when in the afternoon we passed a white Samoan tomb it looked so cool and comfortable that if there had been an opening I think I should have crawled in. But a little later we came to our journey's end in a pretty little village on the tip of a lava flow which had pushed down to the sea. It was cut up by little channels through which the tide ebbed and flowed, a miniature Venice in Savaii.

Here we had our first ceremonial reception. Sixteen chiefs had gathered in to meet us. We were seated with our two boys at one end of the house, the chiefs strung along the side. A Samoan house has a roof of carefully made thatch, but with open sides, which, however, can be protected from storm by letting down curtains of plaited cocoanut leaves. The floor is made of tightly packed small pieces of lava and on this one sleeps. I remember once in the backwoods of Canada listening to an argument among my guides, two Indians and a French-Canadian, on the respective merits of sand and a flat rock as a sleeping place, in which the flat rock won because it would make you sore only in spots. The floor of the Samoan house always seemed to me a compromise between the flat rock and the sand. After we were formally seated and the Pulinuu had announced who we were, the talking man started off on an oration of possibly fifteen minutes. The talking man is a peculiar institution, in every village there is at least one, this function being to make all official addresses; he is one of the underchiefs. At the end of his oration one of our boys who acted as our talking man translated thus, "He says he is very glad to see you; you are very welcome." I imagine the translation was a fairly literal one. Then we suggested an appropriate reply and our boy started off on his oration.

Then a Kava root was tossed to us and we tossed it back. Kava is the universal drink of the South Sea Islands. In Fiji it is grated while green on a coarse stone, in Samoa the root is first dried then pounded into a coarse powder. After the root was tossed back, the Kava bowl was brought in. These bowls are carved out of a single piece of wood, the number of legs denominating the exact kind of ceremony in which they are appropriately used. They are handed down in families and are much prized. A girl seated herself on the floor beside the bowl, some powdered root was placed in it, on that water was poured and the girl proceeded to wash her hands in the mess, at least that is what it looked like, and I had not seen her wash them before. Then a mass of coarse fibre was handed to her which she drew repeatedly through the bowl, wringing it out and handing it over her right shoulder to a girl standing behind her who shook the powdered root out and handed it back over the left shoulder. When all the root was thus strained out, more water was added, the completion of the mixing being announced by a loud clapping of hands. In the old days, the root was chewed and the result expectorated into the bowl, but the government has forbidden this; it is too hard on the teeth. Then the official announcer called the name of the first person to be served. This is supposed to be the most important person present and, in the old days, occasionally a visiting chief, thinking that he had been slighted, would go home, organize a force and return to attempt to avenge the insult. They did not know our names but we were lawyer and doctor and were so called. Then another girl would go up to the Kava bowl, have a cocoanut shell filled and, crossing the house, hand it with a graceful, sweeping courtesy to the person named. It looks like dishwater and has a flat, nondescript sort of a taste, but leaves a clean aftertaste in the mouth and is quite a good quencher of thirst. Why Kava is drunk, I do not know; it certainly has no exhilarating effect whatever, as far as I could feel, though I am told that taken in enormous quantities it brings on a weak feeling in the legs. The ceremonial attending its drinking is, of course, very interesting and this is probably what appeals to the Polynesian.

That night we had a dance, the best part of which was a series of evolutions by a number of young men whose conductor would have made a wonderful cheer leader at one of our football games. Most of the villages are along the seashore and, of course, the men are expert handlers of boats and fishermen, though they did not live in the water as much as I had expected, nor were the rewards of the fisherman more than casual. The octopus is fished for by attaching to a line an oval stone covered with a piece of brown shell, looking not unlike a rat. Colonel Tate told us a folk story of the reason for this bait. Once upon a time an octopus,—this animal is an important figure in Samoan mythology—and a rat went on a voyage but, a terrible storm arising, they were cast into the water. The rat was in a bad way but the octopus said, "Sit on my shoulder and I will swim ashore with you." When they reached the shore, the rat scampered across the belt of dry sand to the edge of the bush and turning, began to revile the octopus, calling him all manner of vile names and even casting aspersions on his ancestry. This made the octopus furiously angry but he could not crawl across the dry sand. Finally, as a crowning insult, the rat said, "Look on your shoulder, see what I have left there." At this the octopus almost burst with rage but he could do nothing and retired to the deep water, vowing that if he ever caught the rat, then he would wreak his vengeance on him. This is why, when he sees the bait which he thinks is a rat, he grasps it furiously and is hauled into the boat.

The houses were garlanded with green leaves in our honor and a piece of tapa, the native paper cloth made from the bark of the paper mulberry, stretched across one end for our sleeping compartment. The efforts of the missionaries are seen everywhere and in every village is a church. Church building seems to be rather their favorite pastime and if one village hears that a neighboring village has a better church, it is likely to abandon its own and build a grander one. The Mormon church has sent out a lot of missionaries and one of them said to us, "I glory in the fact that I am the child of a polygamous marriage. Polygamy is the corner stone of our church, its most important trust, and when we are strong enough—and that day is coming soon - we shall openly practice it." Later in Tuituila I learned of certain facts which led me to believe that the teaching of the Mormon missionaries is subversive of governmental authority and that the Islands would be better off without them.

We were fed on the fat of the land but while taro, yams, breadfruit, roast pig and chicken may be a well balanced ration, yet cooked always in the same way and without any condiments, they are not very appetizing and we lost weight. One day we had stopped in the trader's house for a change. In the morning some young girls gave us a siva, the native dance, after which we gave them a small present. Afterward some older girls gave us a more elaborate one and the present increased. Then the trader announced that the principal ladies of the village wished to give us a siva and we said, as we seemed to be in the siva business that day we should like to have it. Just before they got ready the cricket club dressed up in costume and posed for its photograph. The dance is a series of rhythmic posturings, accompanied by moving arms to the rhythm of a song which is usually the recital of some event. It is without exact figure or step and depends largely on the individual taste of the participants. They had abandoned their conventional Mother Hubbards and wore the old dress somewhat elaborated to meet missionary requirements, coronet of frangipani flowers, jacket of tapa or strings of beads, lavalava of tapa or fibre with wristlets or anklets of green leaves. At no time did we notice anything at all sexually suggestive nor savoring in the slightest of indecency. Our present must have been altogether satisfactory for the women came bearing us gifts, taro and Kava, bananas and chickens which we distributed among the chiefs who had assembled to give us a Kava ceremony in farewell.

To end this joyful day the women proposed that they give us another siva at night, but stipulating that there was to be no present because they were giving it to show how much they thought of us. It was the best we saw, the Taupou danced in stately fashion, but better still was the dance of the men. Dances of the olden time, they gave, war dances where one could see the motif advance, retreat, battle and death. At the end Weill asked if a piece of beautiful tapa which some of the dancers had worn could be bought. In a few minutes it was handed him, "We will not sell it but give it to you for you have been good to us. We have used it long in our dances and hope that you will keep it always." Many such pretty sentiments crop up from time to time, in the next minute they may show themselves purely mercenary; they are midway between their old free giving and the present day business commercialism and it is interesting to watch the transition.

Time had slipped rapidly by and it was necessary to cover the thirty-five miles to Mr. Cooper's in a day to get a boat to Apia. This meant a walk over rough lava or a whale boat. On entering the harbor at Apia such a boat with forty-four oarsmen had rowed round and round the ship, the men singing in unison with their stroke. We found such a boat and finally coaxed the crew to take us,—twenty-two oars there were to this boat. The price was five pounds, then to clinch the bargain we said we should give them two pounds extra for Kai Kai when we reached our destination. This offer roused much enthusiasm but we did not feel sure till we saw the boat launched. The journey was to be made at night, for the trade wind blows less strong then and we waited till the moon came up. The beach was lit with fires beneath the cocoanut palms, glinting on the brown faces of the whole village who had turned out to see us go. "Tofa," they shouted as we pushed off. The wind rose and kicked up a nasty sea; on our lee was a cliff of black lava, dimly outlined by the moon. On we went, hour after hour, the men singing incessantly, the bailer working pretty constantly. We wondered vaguely what would happen if the boat swamped, but a whale boat is a good boat. Finally, as day broke, we headed in toward shore, seven miles short of our destination. There had been some sort of a misunderstanding and when we asked them to go on, they said it was very rough outside and they were very tired. Then we offered them an additional pound; but, after a long and earnest consultation among themselves, they said they did not see how they could do it as they were so tired. But, they added, if we could give thirty shillings they might go on. Then we had a long consultation—everything has to be done very formally—after which we announced that, as they had been so good to us so far, we should pay it. Then with a wild shout of joy, they headed for the open sea. They said that it was rough a little while ago but that it was smoother now, and then those poor tired boys broke into a racing stroke and rowed those seven miles faster than before, singing at the top of their lungs. They are children, pleased with any new toys.

Across from Apia to Pango Pango, where we had to go to catch the boat for home, a matter of some sixty miles, was the only gap in the ease of a pleasant tourist trip and this gap could be easily bridged by putting on a comfortable boat. As usual we went at night, and in rougher weather than usual, in an open motor boat. We stretched out on the hatch cover, amongst a huddle of Samoans, and got what rest we could, drenched with spray and pelted by an occasional rain squall. My comfort was not increased by a Samoan lady's rather constant attempts to sit on my head. I am sure her advances were purely platonic but I repulsed them as well as I could. Shortly after dawn, a break in the high coast line showed, and a little later we sailed into a quiet harbor.

Here another kindness awaited us and this, together with the reception we had had in Western Samoa, would be enough to make it a land of pleasant memories. Captain Pollock, the Governor, and Mrs. Pollock asked Weill and me to his house as guests. There is no hotel in Pango Pango, merely a poorly kept lodging house, and one has to earn a precarious living at a Japanese restaurant which is open when the proprietor happens to be home. The harbor is a perfect one, the best in all these South Seas, but entirely undefended. The naval station has brought an air of material prosperity to the village, but that our method of treating the Samoans as men and brothers works out best results, I quite seriously doubt. They are rather likely to crowd you off the sidewalk and demand more than their rights, so that the impression one gets of them is not so pleasant as that of Apia. The more I see of peoples generally, especially those of lower development, the more I am convinced that the judicious use of the big stick is at least useful if not necessary. Captain Pollock has a difficult task and he is discharging it with wisdom and tact.

When one realizes that, while the "Flu" decimated the rest of Polynesia, not a case occurred in American Samoa, owing to efficient quarantine, it is evident what care we are taking of the natives. And yet they do not appreciate what is being done for them; gratitude is not one of their usual emotions. A trader who knew them well told me that it would be easy to get the signatures of a hundred chiefs to any sort of memorial, simply for the asking.

Our stay in foreign lands was over and, even though our flag had not floated over the governor's residence perched on the hill at the harbor entrance, we should have known that we were among our own from the game playing on the diamond below it.

And now that I have seen the Islands and their people, I suspect that the authors who rave of their beautiful women, must have seen them in the moonlight, the tropic moonlight that witches everything. Most of them are built on too solid a plan for ethereal beauty and their faces are heavy. The missionaries have done them a good turn in introducing the Mother Hubbard; one can imagine beneath it a sinuous grace which is not revealed in the lava lava, in the siva, or Mother Eve's bathing costume. As for the Islands themselves, I happen to be writing this in the Windward Islands and have been trying to make them as beautiful, but my thoughts will turn back to the South Seas. There is the same wonderful green of the verdure breaking out of the exquisite water, the same moonlight in which one dreams, the same caressing air; but there is some added witchery in the South Seas; maybe it is the roar on the reef, the distant sound of the surf always present, rising and falling, never insistent, breaking on the outer reef.

SOME IMPRESSIONS OF SOUTH AMERICA

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Upon the seventh of last September, in Rio de Janeiro, Brazil opened an international exposition to commemorate the hundredth anniversary of her independence. The United States was represented at the ceremonies by the Secertary of State who made a notable address. This visit of Secretary Hughes to Brazil was intended, as he stated, to return the visit of courtesy made to our Centennial Exposition in 1876 by the Emperor, Dom Pedro II, who presided over the destinies of Brazil for nearly sixty years, until finally in 1889, in response to the popular demand for a change from a monarchy to a republic, he voluntarily withdrew. The republic came into being without violence or bloodshed.

As has been customary in connection with other world fairs, the Brazilian Centennial Exposition was made the occasion of the meeting of several international Congresses, among others the Cotton Congress and the Second American Congress of Economic Expansion and Commercial Instruction, both of which met in Rio last October. It was as a delegate of the United States to these two Congresses that I went to Brazil. It was also my pleasure to represent the Chamber of Commerce of the United States on a mission to American Chambers of Commerce in South America, and to bear the greetings of the University of Pennsylvania to its Alumni. My stay in the countries visited – Brazil, Uruguay, Argentina, Chile and Peru—was much too short to enable me to make more than a preliminary survey; but, because of those who had sent me, I was given all possible opportunity to meet as many persons and see as many things as the limited time at my disposal permitted.

My strongest impression of South American countries, in general, is one I should have gotten long before I visited those countries. South America is Latin, while America north of the Rio Grande is Saxon. In this obvious but fundamental fact is to be found the explanation of most of the many, and, to the North American traveller, the surprising differences between the social and political ideals, the manners, the morals, and civilizations of the peoples of North and South America.

Brazil, as we all know, is of Portuguese origin. The other countries of Latin America were conquered and settled and, for more than two and one-half centuries were governed, by Spain; and, when early in the nineteenth century Brazil and the other Latin American countries achieved their independence, they broke away from their mother lands only in a political, not a cultural, sense. Their ideals of government, of religion, of the family and woman's position in the home and in society, of domestic and civic architecture, of property rights, of business methods, of amusements, have been brought from Spain and Portugal, and in the new world have developed under the cultural influences exerted by those countries. Latin-American thought has also been not a little shaped by Italy, and particularly by France, whose cultural contact with South America, especially during the last hundred years, has been very close. During the century that has elapsed since most South American countries set up self-government, they have remained almost as Latin in temperament and customs as are the peoples of Southern Europe.

The observant traveller is made aware of this at every turn. In any country the government is the most obvious institution, and it is especially interesting to observe how definitely the governments in the several countries of South America have been influenced by their Latin or European origin. Their constitutions have been largely influenced by the Constitution of the United States, but with the exception of two or three countries, government in practice is highly centralized—power is ordinarily held by a single man or by a comparatively small group of men instead of by the people at large. This should not be surprising to one who recalls the fact that the American colonies of Portugal and Spain had no experience whatever in self-government, and that property and education were the privilege of the few, while the many were allowed to remain, or were kept, in ignorance and poverty. In such a soil, democracy is an exotic that can take root and gain strength but slowly with the gradual change in social and economic conditions.

In some South American countries, and Argentina is one of them, government is definitely on the road to real democracy, while in others the goal is far distant. This is, however, not spoken in criticism of any particular country. We should not demand the impossible. If sixty or more per cent. of the population of the United States consisted of a servile class of uneducated Indians, or of Indians and negroes, and if twenty per cent. was made up of illiterate people of mixed blood, while only ten per cent. or less of the population was educated, and those ten per cent. or less held nearly all of the property not owned by foreign corporations and individuals, would real democracy or representative republican institutions be possible in the United States? These conditions that would obviously make a democratic government, as we understand it, impossible in the United States prevail fully or approximately in more than one Latin American country. Present governmental conditions are the resultant of historical antecedents and of racial factors and, to some extent, of economic environment. A traveller in South America, and in any country for that matter, must view and appraise the present in the light of the past.

The evidences of the influence of Latin Europe upon cultural ideals and education in Latin America are many. The foreign language most studied in all South American countries is French, and although the text books may be in Portugese in Brazil and in Spanish in other countries, they were probably published in France; and it is quite certain that most books of reference and a large part of the literature upon the library shelves are of French origin or inspiration. English is quite certain to be taught in commercial schools and, to some extent, in other schools, but it is studied as a language, not as a literature. The young men of South America and their sisters who may go abroad for travel or University study go to some country of Latin Europe, seldom to England or any other country having a Saxon civilization. Discussions in certain papers while I was in South America revealed a feeling on the part of the leaders of publc thought that the ideas or ideals of Saxon countries, American, British and others, must not be allowed to undermine or seriously to modify Latin culture.

The fact that the educational leaders in South America have, for the most part, studied in Europe, and particularly in France, instead of elsewhere was indicated in an interesting manner at a banquet that I attended just after reaching Rio de Janeiro. It was a banquet given to the delegates to the International Cotton Congress by their hosts, the Minister of Agriculture of Brazil and the

Agricultural Society of Brazil. From time to time while the dinner was in progress, and for a time after the dinner had been served, a gentleman would rise at his seat in one part or another of the banquet room, and proceed to read a paper. Some of the papers were courteous acknowledgments of the hospitality of the hosts of the occasion; other papers were concerned with one phase or another of the work of the Congress. None of the speakers who rose to read was introduced, nor were the speakers listened to by very many persons, except the presiding officer, who was the President of the Congress, and by a small group of people in the neighborhood of the reader, who might be able to hear and disposed to listen. Most of the banqueters went on with their dinner or even continued conversation with each other. I expressed surprise to my Brazilian neighbor, and asked him why it was the speakers were not introduced by the presiding officer and why quiet was not enforced while the speeches were being made. The answer was "This is the way they do it in Paris." Later I often concluded that the manners and customs which seemed to me unusual were to be explained by "This is the way they do it in Paris" or Spain, or Portugal or some other Latin country of Europe.

I have illustrated in some detail the fact that South American countries in their ideals, manners and civilization are Latin, because that serves to explain what would otherwise be difficult for a traveller from North America to understand, namely, that the United States has comparatively little influence in South American countries. It is true that their constitutions were largely copied from the Constitution of the United States, and it is also true that some of their trade and some of their industries are in the hands of American corporations. But as everybody knows the development of the natural resources of South America and of their trade have, until very recently, been mainly by Europeans instead of by Americans; and as for cultural contacts of the United States with South American countries, they are almost negligible. If the average South American were to express his feelings frankly, he would probably say that he was not very greatly interested in the culture or civilization found north of the Rio Grande. He would be far too courteous to admit to a North American that he had such a feeling, for the South American is a man of generous impulses and courteous manner, as every one who has travelled in South America will bear witness.

It doubtless comes as a shock to some and as a disappointment to many more Americans of the North that the Americans of the South are for the most part little concerned about what the people of the United States may think or do, but are very much interested in and influenced by the ideas and doings of Latin Europe. And yet why should this not be so? The cultural contacts of South America have not been with the United States and are not now to any great extent.

Can this be changed? Can the two continents of America be united and brought closer to each other by the invisible ties of mutual understanding and common feelings? Probably, but the change must come mainly by the slow processes of education, by travel, by the study of languages and history, by the development of a literature that will appeal, if that be possible, to the minds and hearts of Saxon and Latin.

You will note that I am suggesting that the peoples of the Saxon and Latin Americas are to be brought closer together by immaterial rather than material forces. There are many persons, possibly they constitute the majority of those who give thought to this question, who look to quickened communication, better transportation and greater trade to bring the peoples of the two Americas first into closer relations physically and in consequence into closer sympathy. It is quite true that more and better communication by sea, by wire, and by the air, increased commercial intercourse, and a larger investment of North American capital in South America enterprises can do something to unite the peoples of the two continents, but I fear that these forces will not be so effective as most persons expect.

An increased participation by North American capital in the development of the commerce and industries of South America will unquestionably emphasize the need of mutual understanding, but the result may possibly be the friction and even the antipathy that accompany competition among business rivals and are generated by the regulations imposed by apprehensive governments.

Moreover it should be remembered that steamship lines, cables and wireless services—facilities for the speedly transportation of persons, things and ideas—only make communication possible; they do not necessarily furnish the impulse to travel or to exchange goods and ideas. The forces that bind nations to each other most strongly and surely are mental and spiritual. Perhaps cultural is a better name for these forces.

When ties of this kind unite nations they have the strongest possible incentive to trade with each other. Without cultural contacts, even commerce is developed with difficulty. Prior to the World War when the countries of South America were temporarily shut off from Europe and were forced to seek their needed supplies in the United States, the trade between this country and the Continent of South America seemed to us to be disappointingly small. We attributed this relatively small volume of trade to the limited facilities for communication and transportation. This assumption can, however, have been only partially correct, for it is a well-known fact that commercial facilities ordinarily develop in response to commercial needs and demands. Is it not probable that the explanation of the proneness of South American countries to trade with Europe more largely than with the United States is to be found in the fact that the relations of the people of South America, as regards matters other than commerce, are mainly with Europe, not with the United States. And may we not expect a larger trade between the two American continents to follow upon the multiplication of cultural contacts and upon the consequent strengthening of a feeling of mutual interests and aspirations?

The organization that is now accomplishing most in uniting the nations of the Saxon and Latin Americas is the Pan American Union. This institution conceived a generation ago by James G. Blaine and since developed by men like Mr. John Barrett, Dr. L. S. Rowe and other zealous Pan Americanists, has brought about co-operative effort by leaders of all American countries to inform North America about South America and to give to the people of South America a better understanding of the people of North America. By means of the Congresses that have been held in North and South America under the auspices of the Pan American Union and by means of its publications and other educational work, the Union has done a great service and its influence becomes greater year by year.

The universities of the two continents have a duty and an opportunity to be of real service. They are the centers of educational life and influence, and while at any given time they reach only a comparatively small percentage of the total population, the universities can in the long run largely influence the ideals, the thought, and the life of society as a whole. The universities may arrange for the exchange of teachers. They may encourage South American teachers to come to the United States and teachers from this country to fill temporarily chairs in South American countries by exchange with professors there. Greater efforts may be made to have students from the United States spend a part of their college years in South America and to induce students from Latin American countries to study and travel in the United States. American universities can also strengthen their influence in South America by keeping in touch with their alumni. It will help to accomplsh this if the alumni of each large North American university who are residents in the principal cities of South America organize local societies. These societies when well organized and kept active become centers of university influence abroad, capable of being of service not only to the institution of which their members are graduates but also to the countries in which they reside.

The leading newspapers of the two continents of America, as a result of better communications by wire and wireless, are now printing each day a liberal amount of international American news. I was impressed by the large amount of space given by the newspapers of Brazil; the Argentine, and Chile to foreign news and it seemed to me that the dispatches from the United States were given as much space as those from European countries. This is encouraging.

There is a force of very recent development that is possibly doing more than anything else just at present to help the people of all countries to understand foreigners and their ways. I refer to moving pictures. The films made in the United States are exhibited extensively in all South American cities and towns and the people of all classes through the moving pictures are learning how the people of the United States live and act. Without doubt, many of the films exhibited give distorted and incorrect notions of life, but the main things they teach are probably correct. Possibly the fact about the people of the United States that surprises the people of South America most is the freedom enjoyed by women in this country. Our social customs are being revealed to the South

American through the motion picture films, and I was told that the women and girls of South America were beginning to demand greater freedom because of what they had seen and learned in the moving picture theaters.

It need not be said that foreign countries can best be understood by those who travel and study abroad, particularly if the travellers take with them open minds,—a sincere desire to understand conditions as they are and to correct preconceived errors of information. The tide of travel between North and South America is increasing and possibly it is not too much to hope that in twenty-five years from now as a result of travel and study abroad the people of North and South America will know each other much better and have many more ideas and feelings in common.

THE WANDERER IN OUR NATIONAL PARKS *

* The following notes are furnished by courtesy of the Department of the Interior, to whom indebtedness is hereby acknowledged. It is hoped that they may be of service to members and friends of the Society.—*Ed.*

To the American people, Secretary Work of the Interior Department has issued the following invitation:

"With a lavish hand nature has moulded throughout our land the most magnificent and awe-inspiring scenery surpassing in beauty and grandeur that offered by any foreign country. These spots,—our National Parks—have been set aside by the American Government to be maintained untouched by the inroads of modern civilization so that you and your children may enjoy them. Roads have been built through deep-cut canyons, across towering mountain ranges, beside rippling streams filled with fighting trout, and into primal forests. Hotels and camps have been erected to provide comfortable accommodations in the most distant and inaccessible places. Free camp grounds have been provided for those who wish to bring their own equipment and camp out. These unspoiled bits of native America are for you. They are the playgrounds and the recreation parks of the people. To visit them and see them is to inspire pride and make more real your love for America. In the name of the Government I invite you to be its guest."

One of the first official acts performed by Secretary Work upon assuming the Department of the Interior portfolio was to take over an historic piece of ground in the States of Utah and Colorado set aside in a proclamation issued by President Harding, to be preserved for posterity.

This ground has been designed as a National Monument and the Indian word Hovenweep, meaning "Deserted Valley," is the name that has been given it. Containing four separate groups of remarkable prehistoric towers, pueblos, and cliff dwellings that were gradually falling into decay and being depredated by relic-seekers the National Government assumed control of the property. A custodian is to be appointed and the area containing some 285 acres will be permanently protected by the Interior Department for the benefit of the public.

Two of the ruins, Hackberry and Keely, contained in Hovenweep are in Colorado, while the Ruin Canyon and Cajon Groups are in Utah. Each lies within a mile of the well-traveled road between Dolores, Colorado, and Bluff City, Utah, and is accessible by automobile.

The Ruin Canyon Group consists of eleven structures, the largest of which is Hovenweep Castle, sixty-six feet long and twenty feet high. The Keely Group consists of five prehistoric buildings, the standing walls of one of them measuring twenty feet high also. The Hackberry Group consists of five buildings with well preserved walls still standing and the Cajon Group includes important antiquities.

Planting and restocking of waters located in National Parks throughout the country promises one of the biggest fishing years on record. The streams and lakes are expected to be fairly teeming with trout and other game fish at the various parks when the season begins and the parks are thrown open to anglers. The Department of the Interior announces the open season and the character of fishing at each National Park as follows:

Crater Lake National Park, Oregon.—Fishing especially good for rainbow and cutthroat (black spotted) trout by fly casting or trolling from boats. Trout range in weight from one to six pounds. No fishing license required; a day's catch per person is limited to five fish from the lake or twenty fish from other waters of the Park. Planted in 1922, 28,000 rainbow fingerlings and 3,000 silverside minnows for trout food. Season from July 1st to September 30th

Glacier National Park, Montana.—The waters of the Park abound in cutthroat, rainbow, eastern brook, flat, Dolly Varden, and Mackinaw trout, whitefish, and grayling, many reaching large size. The ever abundant grasshopper may be used successfully by those not skilled in the use of the fly. No fishing license required, the limit of a day's catch per person is ten fish. Government fish hatchery in Park; 1,867,700 fish planted in 1922. Season, June 15th to September 15th.

Grand Canyon National Park, Arizona.—Bass, crappie, and catfish, and in several clear water tributaries of the Colorado some trout have been planted with fair success. Twenty fish or not more than twenty pounds of all varieties is limit of a day's catch per person. State fishing license required, nonresident or alien, game and fish, $20; birds and fish, $10. Resident, game and fish, $1.25. Season all the year.

Lafayette National Park, Maine.—The Park lakes are well stocked with lake trout and land-locked salmon ranging in weight from one to six pounds. Trolling is the most satisfactory method of fishing, the lure varying with the fancy of the individual. Phantom minnows, archer spinners with live bait, Rangeley or Moosehead spinners with worm or fly are all equally good. Season opens about April 10th.

The ocean too has its charm for the fisherman. An hour or two spent in the morning on the bay or an all-day trip "outside" is time well spent. Cod, haddock, and other varieties of salt water fish are to be caught. This kind of fishing usually begins May 30th, as the weather is then most suitable for days to be spent on salt water. The limit of the catch from waters of the Park is fifteen fish or twenty-five pounds per person per day. State fishing license required for nonresident, fee $3.15.

Lassen Volcanic National Park, California.—A variety of trout in lakes and streams makes fishing enjoyable sport. State fishing license required, fees, resident, $1; nonresident, $3. The limit for a day's catch per person is twenty-five fish, or ten pounds and one fish, or one fish weighing ten pounds or over. Season from June through September.

Mount Rainier National Park, Washington.—On account of glacial origin, streams contain much sediment in summer and trout do not rise. In the spring and fall cutthroat, eastern brook, rainbow, and Dolly Varden trout may be caught with bait and occasionally will take a fly. In 1922, 67,000 trout planted in Park waters. No fishing license required. The limit of a day's catch per person is ten fish. Season from June through September.

Rocky Mountain National Park, Colorado.—The streams and lakes are annually stocked with eastern brook, native (cutthroat), and rainbow trout from the State fish hatchery in the Park. Planted in 1922, 370,000 eastern brook and 25,000 native trout; also 330,000 eastern brook trout were planted in waters adjacent to the Park.

State fishing license required (not required of boys under sixteen or of women); fees, resident, $2; nonresident, $5. The limit of a day's catch per person is thirty fish or not exceeding a total of ten pounds. Season from May to November.

Sequoia National Park, California.—Rainbow, steelhead, Loch Leven, cutthroat, and golden are the varieties of trout found in the Park, and Park waters are annually restocked. State fishing license required; fees, resident, $1; nonresident, $3. The limit of a day's catch per person is twenty-five fish or ten pounds and one fish, or one fish weighing ten pounds or over. Season from June to October.

Yellowstone National Park, Wyoming.—Trout fishing in Yellowstone water is unexcelled. Yellowstone Lake is the home of large trout which are taken freely from boats. Cutthroat, rainbow, Loch Leven, brown, Mackinaw (lake), eastern brook trout, Montana grayling, Rocky Mountain whitefish, yellow perch, and chub are the principal varieties of Yellowstone fish. Fish hatchery in the Park is maintained by the United States Bureau of Fisheries. Total fish plants for 1920, 2,029,300; 1921, 4,051,000; 1922, 8,609,800. No fishing license required; the day's catch per person is limited to ten fish from all waters within two miles of the main road system. From other waters in the Park twenty fish per person may be taken. The fishing season in the Park does not ordinarily begin before July, at which time trout fishing is at its best.

Yosemite National Park, California.—Few anglers during the summer and autumn use bait in fishing the lakes and streams of Yosemite, but depend upon the artificial fly. The California Royal Coachman almost always proves the best lure. Early in the season grasshoppers and salmon eggs are used for bait with success. Ten species of trout in relative order of abundance are rainbow, eastern brook, Shasta, Loch Leven, cutthroat, steelhead, brown, Dolly Varden, golden, and Tahoe. State fishing license required; fee, resident, $1; nonresident, $3. The limit for a day's catch per person is twenty-five fish, or ten pounds and one fish, or one fish weighing ten pounds or over. Park waters are extensively restocked in co-operation with the State Fish and Game Commission. Season from May to October.

BOOK REVIEW

Younghusband, Sir Francis, K. C. S. I., K. C. I. E., President of the Royal Geographical Society. *The Heart of Nature,* or the Quest for Natural Beauty. 235 pages. E. P. Dutton & Co., New York, 1922.

Every page of this book reveals the author's love and a sympathetic bond with Nature; he endows Nature with a personality having the attributes of spirit and idealism, and thus discloses a broad vista for a closer touch with Nature and more perfect enjoyment of her many fascinations. The region of the Sikkim Himalaya is chosen as best exemplifying the wonders of river, valley, forest, gorge, flora, and the entire range of plant and insect life from tropical jungle to alpine upland.

His enthusiasm for mountains such as Kinchinjunga and Mt. Everest knows no bounds; as obstacles apparently unconquerable always afford tremendous attraction to the inteprid explorer, fighter, or seeker after knowledge. High solitudes bring forth the best in one's nature and sunset's coloring tinges mental pictures long cherished by the artist and the poet.

In Sir Francis Younghusband's presidential address to the Royal Geographical Society, printed at the end of the volume, he points out the connection between geographical knowledge and natural beauty, and wishes to emphasize and encourage the search for the beauty of Nature as an integral part of the science of Geography. As much time would be given to the description of the beautiful world in which we dwell as to the measurement of its distances and altitudes.

The author is well fitted to give evidence in regard to Nature, as he has had varied experiences in many lands and has found beauty, love and fellowship in all.

L. B.

GEOGRAPHIC NEWS AND NOTES

The Crossing of the Sahara by Motor was successfully made by a French expedition commanded by M. Haardt. Five Citroën cars, fitted with caterpillar attachments, were used, the party leaving Tugurt on December 18th and arriving in Timbuktu on January 7th. Despite the difficult nature of the ground, including wide stretches of waterless desert, the cars gave no trouble and arrived in good condition after a journey of nearly 2000 miles.

The prehistoric man of the Ozarks region was probably a type of Indian found nowhere else in America, according to conclusions reached by members of an expedition of the Heye Foundation in New York. It is estimated that some of the skeletons unearthed are 1500 years old. Weapons and implements were found in a remarkably good state of preservation.

Ruins unearthed at Ur, the Chaldean city, are believed to antedate the Christian era by thirty-six centuries. The expedition, under C. L. Wooley, is being conducted jointly by the British Museum and the University of Pennsylvania. At present work is being done in uncovering the Temple of the Moon God, parts of which were brought to light in 1918. A fragment of a stone vase has been dug up on which is a representation of the moon and sun gods receiving the adoration of worshipers. Jewelry of the period of Nebuchadnezzar, many alabaster vases, and inscribed door sockets have been found.

A fossil skull from the Tertiary Period is stated to have been discovered in Patagonia by Dr. W. L. Wolfe, formerly attached to the Division of Anthropology of the Canadian Geological Survey. If the claim is indubitably established, the discovery is the oldest of human remains yet found. The earliest unquestionably human bones hitherto known are the jaw of the "Heidelberg Man" of the Pleistocene or glacial era. The "Piltdown Skull" is assigned to the late Pleistocene. The latest division of the Tertiary period precedes the glacial eras by many thousands of years.

General George Pereira, of the British Army, arrived in Lhasa on October 17, 1922, completing the first journey by a European from China to Lhasa since that of the celebrated Abbé Huc in 1845. Of the 6360 miles from Peking, over 3500 were traversed on foot.

The Aztec Ruin, a celebrated pueblo in northern Mexico, has been proclaimed a National Monument. It is a large E-Shaped structure of approximately 500 rooms, the first story of which is standing and twenty-four rooms possess the original ceilings intact. The walls are of sandstone and the dressed faces are reasonably plumb. Ceilings are supported by large beams cut and dressed with stone tools, and are an interesting example of Stone Age workmanship.

ACTIVITIES OF THE SOCIETY

CLIMBING MT. EVEREST

GEORGE H. LEIGH-MALLORY

In past years, the members of the Society have acclaimed polar heroes—Peary, Amundsen, Shackleton, and others. On January 27th, introduced by Past President Henry G. Bryant, the Society was thrilled by the story of Mr. Leigh-Mallory, who spoke on the expeditions of the Alpine Club and the Royal Geographical Society to Mt. Everest.

These expeditions, the first extensive piece of explorations undertaken since the World War, represent organized attempts to attain the highest point of the earth's surface. With the aid of maps and unusually striking lantern views, Mr. Mallory conducted his hearers through the preliminary journey from Darjeeling to the Tibetan plateau, whence the expeditions turned westward toward Mt. Everest. The route makes a great detour to avoid crossing the prohibited boundaries of Napal. From a base on the northern side of the mountain, three advance camps were made on the Rongbuk glacier, Camp III being placed at an altitude of 21,000 feet.

From this point, the North Col (Chang La, 25,000 feet, reached during the 1921 Reconnaissance) was the next stage; and on its summit was placed Camp IV. Higher camps were made, and Mr. Mallory described the two high climbs, each a world's record for altitude on the earth's surface. The first climb, by Mallory, Morshead, Norton and Somervell, made without oxygen, reached 26,800 feet. Later on, Finch, Bruce and a gurkha N. C. O., Tejbir, assisted by oxygen, reached an elevation of 27,300 feet. The official height for Mt. Everest is now 29,141 feet. A third attempt, made after the beginning of the monsoon, ended in disaster, an avalanche engulfing the climbers below the North Col and resulting in the death of seven native porters.

The Mt. Everest Committee expects to send out another expedition in 1924, and hopes by establishing more advanced camps at altitudes above 26,000 feet to enable a party of four men to make the final dash.

FRONTIERS OF THE UNIVERSE

MR. B. R. BAUMGART

With a splendid series of astronomical photographs from the Lick, Yerkes and Mt. Wilson observatories, members and guests of the Society on February 7th were guided by Mr. Baumgardt through "the Land of Infinite Distances." The nature of sun-spots was outlined and their existence as areas of burning hydrogen was shown by pictures taken with the world's largest telescope on Mt. Wilson. The moon was described as a dead planet, without water, atmosphere, or life. There are more than 250,000 known volcanic craters on its surface, some of the smaller ones having a diameter of thirty-five miles. A number of the mountains exceed 35,000 feet in elevation. On the planet Mars there is atmosphere and water, but no life, and the so-called canals cannot be ascribed to human agency. Planets are all subject to the same physical laws and contain the same elements; this is proved by spectroscopic methods, the Mt. Wilson spectroscope having a 150-foot tower and a constant-temperature laboratory, the latter ninety feet underground. The "milky way" was pictured and the "coal sack" shown, through which solar systems, far beyond, may be photographed. Mention was made of the total solar eclipse which will occur in January, 1924, the lecture concluding with a discussion of whirling spiral and ring nebular theories in their relation to planet formation.

MY SIX YEARS IN THE JUNGLE OF MALAY

CARVETH WELLS, F. R. G. S.

A land, "where fishes climb trees and look at you, and where tapioca is a poisonous potato," was described before the Society on February 21st by Mr. Carveth Wells, formerly a British government engineer in the Malay peninsula. Everything is inverted and unusual in Malay according to Mr. Wells. Rain falls on an average of 270 days a year; bamboo grows an inch per hour; it is legal for a man to lie to his wife, and certain birds (the hornbills) thrive on a diet high in strychnine content. The animals are of great interest, elephants being highly trained and skilful laborers. Black panther, tiger, and the mouse-deer, seven inches in height, afford attraction for the naturalist and sportsman. The natives of the Malay are skilled metal workers and artisans, Mr. Wells exhibiting various knives and swords as well as some attractive Batik costumes. A primitive method of fire-making, by piston friction and cocoon tinder was demonstrated.

AUSTRALIA'S WILD NOR'WEST

M. P. ADAMS

With remarkable slides and motion pictures, Mr. M. P. Adams, on March 7th, conducted the Society on an expedition across Australia, emphasizing the tremendous contrast between the centres of population in the southeast, exemplified by the beautiful cities of Melbourne and Adelaide, and the wild savagery still existing in the northwest, in the region near Cape Voltaire and the islands of de Rougemont.

Civilization has extended into western Australia, chiefly as the result of gold discoveries in the Kalgoorlie area and because of the pearl industry along the northwestern coast. The Northwest is a section well adapted for increasing cattle herds, although the climate is not alluring to white men. In the region, natives are only partially civilized, hunting is done with spear and boomerang, while cannibalism is secretly practiced. Along the northwest coast are reefs, similar to the Great Barrier Reef, along which the dugong or sea-cow is found and hunted. On Larosse island, turtle abound and are sought for their eggs and valuable shell.

THE WONDERLAND OF THE EASTERN CONGO

T. Alexander Barns, F. R. G. S.

A region of Africa, hitherto unmentioned in books on the Dark Continent, was described by Mr. Barns to the Society on March 21st. This region, a plateau containing the largest volcanic crater in the world, lies about 125 miles from Mt. Kilimanjaro, in northern Tanganyika territory, formerly German East Africa. The crater, called by the Masai tribes "Ngorongoro," is not far from the rim of the great Rift valley, and has a diameter of more than twelve miles and precipitous lateral walls exceeding 2000 feet in altitude. There is meadow land and a large lake in the crater, into which drain some large streams from smaller nearby craters.

The crater is a tremendous wild game refuge, practically undisturbed and affords unusual opportunities for the naturalist and photographer. In this region and in the Belgian Congo, Mr. Barns secured motion pictures of many animals in their native haunts, hartebeeste, buffalo, leopard, tiger, hippopotamus, elephant and gorilla. None of the pictures were made with the assistance of telephoto lens, thus demanding very close range and increasing the danger to the operator.

THE ROMANCE OF THE LAST CRUSADE.

Major Vivian Gilbert.

A thrilling word picture of the British campaign in Palestine was presented before the Society, on April 4th, by Major Vivian Gilbert, actor-soldier.

Marches northward from the Suez canal were filled with great hardship for men unaccustomed to tropical existence. Sand was overcome by the assistance of chicken-wire roads, while limited water supply was supplemented by a pipe-line from the Nile, which eventually attained a length of more than 200 miles. Many severe engagements took place; fighting was always in the open and there was no trench warfare, the British plan being to keep the enemy always in retreat. The front, from Gaza to the Dead Sea, was carried slowly northward, through many of the scenes of Biblical incident, crossing old caravan routes made famous by the Crusaders and the Napoleonic armies.

It is unofficially current that the surrender of Jerusalem was accepted first by a wandering company's cook, and that it passed through several hands before being received by the Commander. Allenby's entrance into Jerusalem confirmed an old tradition that "when the Prophet shall come out of the West and the waters of the Nile shall flow across the Desert, the Turk will be driven out of Palestine." Soon afterward, the British front, across the northern end of the Dead Sea, established contact with the Arabian forces operating under Feisal and Colonel Lawrence and assured success.

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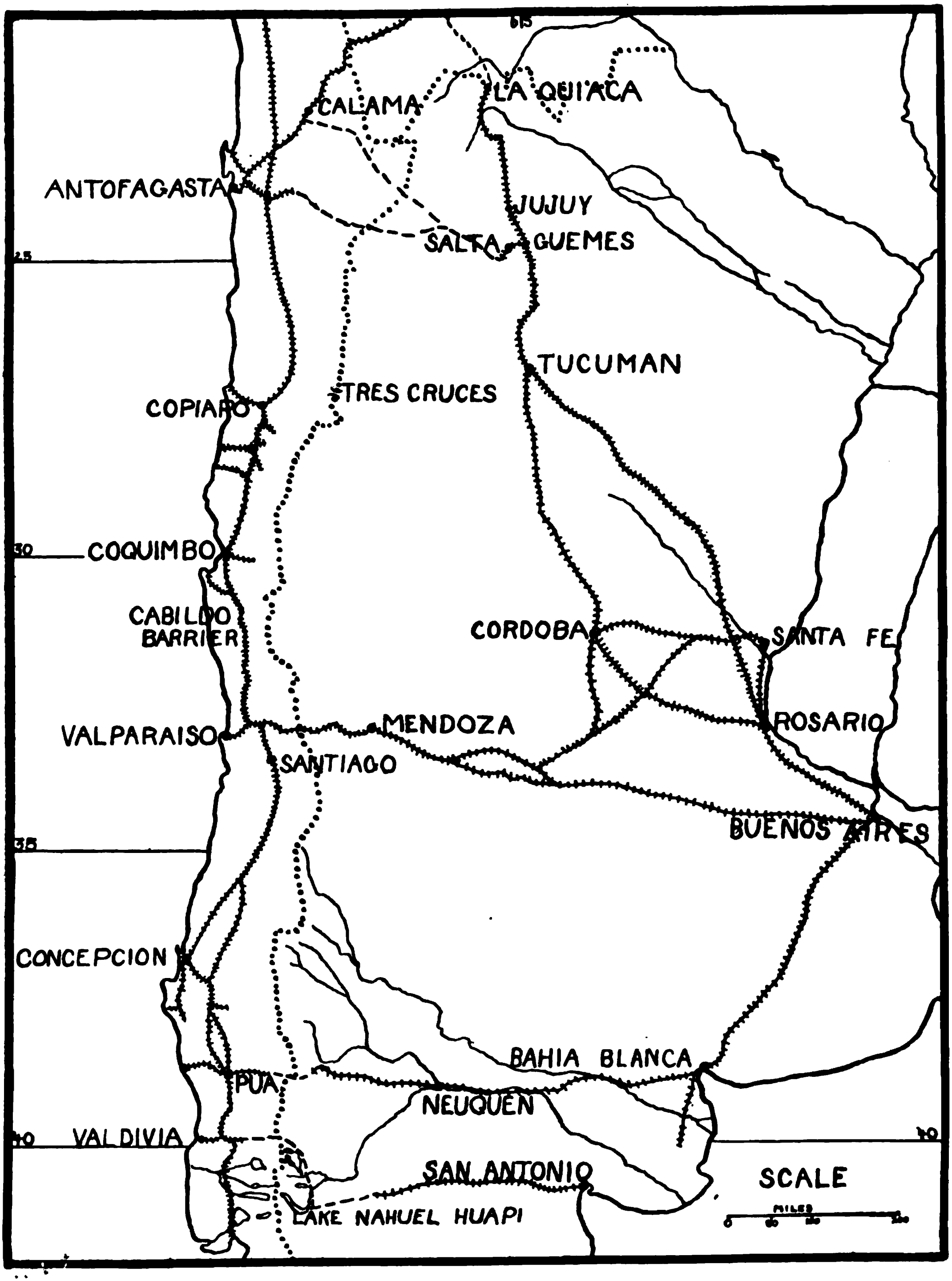

MAP SHOWING THE TRANS-ANDEAN RAILROAD AND RAILROAD PROJECTIONS BETWEEN CHILE AND ARGENTINA

GEOGRAPHIC FACTORS IN THE DEVELOPMENT OF TRANS-ANDEAN COMMUNICATIONS BETWEEN ARGENTINA AND CHILE

By Preston E. James

University of Michigan

The value of a mountain pass depends on the ease of passage and on the need for passage. Low passes with easy approaches may be quite neglected if there is little or no exchange between the peoples on either side. Conversely, two regions separated by a mountain barrier and with markedly contrasted products may make use of relatively high passes with difficult approaches. The contrast of products may be due to differences of climate; to differences in the natural resources or soil conditions; or to differences in the stage of economic development. Also, where one or two passes are conspicuously lower than the others, traffic will concentrate on these, and they will become of relatively more importance.

Relief and Climate

The mountains which lie between Chile and Argentina include the southern part of the Middle Andes, where there is a high plateau between two major ranges; and the Southern Andes, where there is a single major range. The Middle Andes extend about as far south as latitude 30°S. The high, arid, Bolivian Plateau reaches Tres Cruces at the southern boundary of the Argentine territory of Los Andes.[1] Beyond this the eastern range plays out in a series of spurs, between which there are acres of lowland, as in the Argentine provinces of Rioja and Catamarca. The Cordoba Hills are a detached spur, related physiographically to the eastern ranges.[2]

South of about latitude 30°S. the single major range of the Southern Andes, flanked by minor ranges, continues to Cape Horn, becoming progressively more heavily glaciated and having lower passes southward. Between latitudes 22° and 35°S., Brackenbusch describes no less than 111 possible passes, most of them nearly 13,000 feet (4,000 meters) in elevation.[3] South of Mendoza, however, the passes become much lower. The pass at Lake Nahuel Haupi, the Perez Rosales Pass, is only 3,215 feet (980 meters) above sea level. Several other passes will be mentioned below as we discuss the development of the transmontane trade routes.

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[1] Brackebusch, L.: Die Kordillerenpässe zwischen der Argentinischen Republik and Chile, vom 22° bis 35° S.B.; Zeitschrift der Gesellschaft für Erdkunde zu Berlin, vol. 27, p. 262, 1892.

[2] Church, Col. G. E.: South America: An Outline of Its Physical Geography; Geogr. Journ., vol. 17, p. 335, 1901.

The climate differs somewhat from north to south. In the north the climate is prevailingly arid, although torrential rains and floods are common in summer along the east base of the mountains in northern Argentina. In the Southern Andes the climate becomes wetter on the western side and drier on the eastern side, as one goes southward. In this section there are heavy snows on the Chilean side every winter, which usually block the passes for several months in the year. The heavy winds, too, are a source of hardship and even danger to travelers at the greater elevations. In some exposed places they are even strong enough to blow a loaded mule off the trail.

Development of Trans-Andean Communications

The Uspallata Route

The development of trans-Andean communications shows a number of very pretty examples of the interplay of geographic factors, and of changes in the direction of geographic forces with the economic growth of the surrounding regions. For instance, let us consider the geographic complex which has resulted in the importance of the route over the Uspallata Pass.

This pass, popularly known as *la cumbre,* is 12,602 feet (3,842 meters) in elevation. The Argentine approach leaves the piedmont town of Mendoza and climbs Las Cuevas Valley. The descent on the Chilean side is by way of the Rio Juncal Valley to Los Andes and beyond to Santiago and Valparaiso. Not far south of the Uspallata route there are many lower passes, where the glaciers have notched the crest of the mountains. Between latitudes 36°41'S. and 37°41'S. there are 21 cols, ranging from 5,681 feet to

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[3] Brackenbusch, L.: Op. cit., pp. 271-346 and Map.

8,390 feet (1,732 meters to 2,558 meters) in elevation.[4] It would seem that a short detour southward would have provided a much easier pass route.

The explanation of the use of Uspallata must not be sought, however, in present day conditions. Its present importance is an inheritance from colonial times. It is necessary, first, to picture the conditions in Chile and Argentina at the close of the 16th century. In Chile, Santiago was the center of a young colony, and other settlements were spread out southward in the Central Valley as far as the *frontera* at Concepcion. South of this city there were only scattered settlements in the forest, and routes of communication were constantly exposed to Indian raids.[5] Thus on the Chilean side the only available passes must have been north of latitude 37°S. We have already seen that there were a number of passes available.

On the Argentine side, however, it will be remembered that settlement was spreading from the north along the Andean piedmont and down the rivers. Only the northern Pampa east of Tucuman and Cordoba was used for the pasturing of mules and cattle. The southern Pampa was still the home of fierce nomadic savages, whose attacks even on Buenos Aires retarded its final settlement until 1580. The Andean piedmont south of Tucuman, Cordoba, and Mendoza was less inviting than that farther north, because of its increasing aridity. The fertile irrigated area around modern Neuquen was almost unknown save for exploring missionaries. A study of the map will show that all twenty-one of the cols mentioned above are at the headwaters of the Rio Negro or the Rio Colorado, and thus their approaches lead from the south, from regions then uninhabited by white men.

The Uspallata route took the shortest path from Santiago, the center of colonial Chile, to Mendoza, the southernmost of the important colonial cities of Argentina. A pass farther north would have brought the traveler either into or north of the Cabildo Barrier. A pass farther south would have required a long piedmont trail southward from Mendoza through arid country, little known, and exposed to the raids of hostile savages. Thus the colonial route was unavoidably determined.

[4] The Chilean Statement, vol. 3, p. 1057.

[5] Jefferson, M.: Recent Colonization in Chile; Amer. Geogr. Soc. Research Series No. 6, p. 29, New York, 1921.

Up to the present time the Uspallata route has held the place of first importance as the line of communication between Chile and Argentina. Over it was carried what little intercourse there has been between these two nations. When the difficulties of the passage are reviewed, and when we appreciate that the pass could not be used for four or five months every year, because of snow, we see the reason for the lack of sympathy which until recently characterized the relations between Chile and Argentina. There is no breeder of distrust like a lack of contact.

As time went on, the Andean piedmont became gradually better known and the other lower passes to the south were discovered. San Martin, in his famous crossing of the Andes in 1817, made use of five other passes north and south of his main advance over Uspallata. There are several reasons, however, why the Uspallata Pass continued to be really the only one of importance. In the first place, it was still on the most direct route between Santiago and Mendoza, and thence straight across the Pampa to Buenos Aires. A good trail had been built, well marked and supplied with shelters, while other passes were at best only crossed by rude trails. More important still, there was no demand for the discovery and development of better routes. Partly because of the difficulty of passage; partly because Chile had not yet felt the pressure of a limited area and Argentina's attention was focused on her rich Pampa; but essentially because of the similarity of products in Middle Chile and Argentina, the demand for better communications was not felt. In both regions there was good grazing land. Both of them had agricultural land for wheat and other crops. Both Mendoza and Santiago were famous for their wines. Truly, Middle Chile and Argentina had little to exchange; the development of better routes than that via the historic Uspallata Pass was unnecessary.

Railroad Development

Then came the railroad. The first surveys were made as early as 1870. The use of one of the southern passes would have been possible. The line would have passed through undeveloped but potentially rich land, and would have involved no sensational engineering. Nevertheless, the "Transandino por Juncal," or the Uspallata route, was chosen. Many of the same factors entered into this choice that originally determined the trans-Andean trail. In the absence of an economic pressure the field was left clear for more sentiment than might otherwise have been allowed. A railroad over a southern pass would have ruined Mendoza and weakened the prestige of Santiago. The landed interests—the conservatives—rebelled at such a thought, and the old Uspallata trail became the route of the first trans-Andean railroad.

Construction on the "Transandino por Juncal" was begun in 1889. The work went on slowly, however. In 1893, ninety-one miles (147 kilometers) of one-meter gauge were completed from Mendoza to Puente del Inca, and later the tracks were laid to Las Cuevas. On the Chilean side a broad guage was used as far as Los Andes. Beyond that station the meter guage was built by degrees toward La Cumbre. For many years the passage between the Chilean rail head and Las Cuevas was made by mule back or in little carts, drawn by mules. A long tunnel was finally built under the pass, so that the highest elevation was reached at the Chilean end at 10,463 feet (3,190 meters). The tunnel was opened on the 5th of April, 1910. Regular service was inaugurated on April 16th of the same year.

The total distance from Buenos Aires to Santiago over the new railroad is 896 miles (1,445 kilometers). The narrow guage between Mendoza and Los Andes is 154 miles (248 kilometers) long. Here there are a number of long rack sections, and in places the grade reaches 8 per cent. If there is no delay, the trip from Buenos Aires to Valparaiso may be made in thirty-six hours. Unfortunately, however, delays are all too common.

The construction on the Chilean side was more difficult than on the east, due to the heavier snowfall and the stronger winds. So strong are the winds that doors have to be placed at the western end of the tunnel, for otherwise the trains ascending from the Argentine side could scarcely make headway. A large part of the line on the Chilean side is poorly placed, being laid along hillsides where mud slides and avalanches occur every spring. The expense of building retaining walls of concrete, as in the case of the Sao Paulo line in Brazil, would not be justified by the traffic. Thus nearly every winter the line is blocked, and uninterrupted communication can only be depended upon in the summer months.

Other Trans-Andean Projects

By the middle of the 19th century all the productive land in Middle Chile north of the *frontera* was occupied.[6] Because of the feudal system of land holding and the consequent impossibility for the working classes to own their own land, there was a tendency for this class particularly to emigrate.[7] At the present time the majority of the small farmers in the irrigated valleys of the Argentine piedmont between San Juan and Neuquen are Chileans.[8] They have crossed the border to take advantage of Argentina's abundant land. Chile is no longer a country for immigrants.[9] Extensive methods of land utilization have already been replaced by more intensive methods, as is revealed by the larger per acre yields of Chilean crops as compared with Argentine crops.[10] Partly as a result of the limited area and the tendency to expansion; partly because the population centers of Chile lie so close to the Andes Mountains, the Chileans have been far more interested in trans-Andean railroad projects than the people of Argentina. The following are a few of the trans-Andean projects:[11]

(1) Antofagasta to Salta (under construction on both sides of the boundary).
(2) Copiapo to Tinogasta (a projection of the early Calderato-Copiapo line, the first trans-Andean project).
(3) San Bernado, via San Jose and Volcan (Transandino por Maipo).
(4) Tinguiririca, via Las Damas.
(5) Curico, via Los Quenes and Planchon.
(6) Talca, via Risco Bayo ("Transandino por Maule").
(7) San Carlos, via Rio Nahueve ("Transandino por Nuble").
(8) Chillan, via Recinto.
(9) General Cruz, via Polcura.

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[6] Jefferson, M.: Op. cit., p. 31.

[7] Jefferson, M.: Op. cit., pp. 34-35.

[8] Personal conference with Dr. A. E. Bunge, Director General of Statistics, Argentine Republic, and Professor in the University of Buenos Aires.

[9] Jefferson, M.: Op. cit., p. 49.

[10] Jefferson, M.: Op. cit., p. 51.

[11] Barclay, W. S.: The Geography of South American Railways: Geogr. Journ., vol. 49, p. 245, 1917.

(10) Monte Aguila, via Travan and Antuco ("Transandino por Antuco").
(11) Caucatin-Pua, via Lonquimay and Pino Hachado ("Transandino por Neuquen"—under construction on both sides of the boundary).
(12) Cajon, via Llaima.
(13) Loncoche, via Villarrica.
(14) Collilelfu, to San Martin de Los Andes, via Lake Rinihue ("Transandino San Martin").
(15) Valdivia to San Antonio, via Lake Nahuel Huapi.

Of these only the Antofagasta-Salta, the Pua-Neuquen, and the Valdivia-San Antonio have any prospect of meeting an Argentine line.

It is not a matter of chance that these three are located either at the extreme north or the extreme south of our region. While it is true that the products of Middle Chile and Argentina are essentially alike, we can see that in the north there is a very great contrast. The large laboring population in the nitrate fields must be supplied with food from outside. Northern Argentina is rich in its potential productivity, but lacks a developed market. The town of Salta occupies a position between contrasted regions, and since colonial times it has been the center of exchange between these regions. In colonial times, however, the Atacama desert was peopled only by a few scattered Indian settlements. The demand for agricultural products was small, and chiefly limited to cattle and mules. Trails crossed the Andes from Salta, one via Alto de Lari and San Pedro de Atacama to Calama; the other via the San Francisco Pass to the oasis of Copiapo.[12] When the demand for foodstuffs increased because of the discovery and exploitation of the nitrates, these trails were used more frequently to drive the herds of cattle into Northern Chile, the latter being gathered even from the Gran Chaco and fattened near Salta.

The railway project has recently been agreed upon by the Chilean and Argentine governments. The exact route is not yet decided upon. The line will be a continuation of the present branch from Guemes (on the railroad to Jujuy and La Quiaca) to Salta and Rosario de Lerma.[13] This part has been finished. From Rosario de Lerma the railroad will climb to the Chorrillos Pass, at an elevation of 14,665 feet (4,471 meters). Beyond this there are two proposed routes: one via Huaytiquina to San Pedro de Atacama and the Antofagasta-Bolivia railroad at Sierra Gorda; the other via Socompa, farther south. The latter line would serve an important nitrate field and would be shorter, while the former would serve an important mining district, as well as the small oases of San Pedro de Atacama. The longer line is preferred, at least by the Chileans.

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[12] Wrigley, G. M.: Salta: An early Commercial Center of Argentina; Geogr. Rev., vol. 2, p. 127, 1916.

Probably an agreement on this line could not have been reached as easily if Argentine exports alone would have been stimulated. In 1921 Argentine exports to Chile were more than double in value those of Chile to Argentina.[14] Chile probably would not have agreed to this project, if there had been no compensating stimulation of her own exports; and it must be remembered that the extensive agriculture of Argentina creates no demand there for the nitrate as a fertilizer. As a part of the same agreement the two governments have authorized the completion of the "Transandino por Neuquen" from Pua, on the *Red Central,* by way of the Pino Hachado Pass (5,983 feet or 1,824 meters) to Neuquen. This will give an outlet for the coal fields around Lebu and Concepcion, and also for Chilean timber. Thus the import of Argentine foodstuffs in the north will be paid for by the export of Chilean coal and timber in the south. The almost complete lack of coal in Argentine insures a steady demand.

Another line duplicates the "Transandino por Neuquen," ninety-three miles (150 kilometers) farther south. It is projected to connect Valdivia at least with steamboats on Lake Nahuel Huapi. On the Argentine side the railroad from San Antonio is being built toward Nahuel Huapi. At present such a line would be of chief value as a tourist route, for the region can boast of the characteristic scenery of a mountain area sculptured by glaciers. If the manufacturing cities ever grow up along the piedmont north of Nahuel

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[13] Maury, R. F.: The New Trans-Andine Railway from Salta to Antofagasta; Review of the River Plate, pp. 617-620, Buenos Aires, March 10, 1922.

[14] Correspondence with the U. S. Department of Commerce, Bureau of Foreign and Domestic Commerce, Washington, D. C.; from Chilean statistics.

Huapi, this railroad might become an important line of transportation.

Thus, as the economic development of the country progresses, and as natural resources are discovered and exploited, geographic factors which were long dormant and only potential in their influence begin to exert a pressure. With a happy balance of exports and imports, transportation routes are beginning to develop in the north and in the south. Yet persistently since colonial times and apparently as far as we can predict in the future, the middle route by way of Uspallata must be content with a political and sentimental value, and with a limited economic need.

TWO NORTHERN ADVENTURES OF JOHN SEMMENS

B. W. Mitchell

No man perhaps ever knew more accurately and intimately the topographical details of the great area north of the forty-ninth parallel, comprising the lakes and rivers which drain northward into Hudson Bay, and few have made more interesting minor contributions to the geographical knowledge of this region than John Semmens, Inspector of Indian Agencies for the Dominion of Canada.

Semmens was every inch a man; honored, trusted, and revered by thousands of people of our great Neighbor of the North, white and red, official and non-official. He began to study the Canadian wilderness when a young man, as a missionary to the Indians. He quickly gained the confidence and affection of his red wards, his staunch defense of them against dishonesty and oppression soon winning him official recognition in appointment to the important post which he held for many years. His life, as may be imagined, was filled with high adventure, as must be the life of any man who studies geography and ethnology at first hand.

It is a decade since I last saw him, and he was then past the allotted span of life; it is probable, therefore, that he has since passed on, certainly he no longer pursues the duties of his arduous office. I knew him in his old age, and the quiet, brave resourceful patriarch, with the flowing white beard of a Metropolitan Bishop of old, would in rare moments charm his friends with tales of his adventures and "hairbreadth 'scapes." The two experiences are from his lips, retold from notes made at the time:

"I spent part of my life on a dog-sled, part on snowshoes, and the rest in a canoe. Is it any wonder that I had some close calls?

"I believe in God and His Providence, and though some men tell me that it was coincidence, chance, fortune . . . what you will . . . that brought me safe out of my many adventures, *I* know that it was God, because He still has work for me to do in the service of my country.

"With my canoe and one man, an Indian, I was once at Norway House, at the Head of Lake Winnipeg, where the Nelson

River leaves the lake for its wild race to Hudson Bay. These great rivers of the Northland are fearful things. They are your enemies. Their rapids roar at you like lions; their smoother stretches hiss at you like serpents. They are cold with the chill of death, and the heart of the strongest swimmer cannot beat many minutes in their icy waters.

"I had some Indian affairs to settle at a village two days travel down the Nelson. We slipped down swiftly and safely, got the Indians fixed up and started to paddle back. Progress was slow against the tremendous current, and the mosquitoes were a torment. No one who does not know the rivers and the muskegs of the Northland knows mosquitoes. I've always felt a bit of sympathy for wicked old Pharaoh in his plague of flies, for I know they were mosquitoes. No other fly can do much more than annoy; the mosquito is a torture and a curse.

"Towards evening of the second day out on the return trip I saw a rocky islet in the Nelson which was absolutely bare of vegetation: there was not a bush, not a blade of grass, not so much as a patch of moss on it. 'That,' said I to my man, 'is the place to camp. There will be fewer mosquitoes.' The current swept fiercely by, piling up the water on the upper side of the rock, and rushing past in a V. We landed. As I had surmised, we found no mosquitoes; the wind had a fair sweep over the rock and blew them away. We set up the tent, weighting down the corners with fragments of rock, for there was no soil in which to drive tent pegs. Of course no boughs were to be had for bedding, but one can sleep fairly well on a rock if he's tired and not too bony. We hauled the canoe ashore and turned it upside down, ate a cold supper without even tea, and turned in.

"Some time during the night came a terrible storm, one of the kind the level bush country knows and dreads. A 'zephyr' entered our tent door, lifted up the whole thing and blew it away. We never found it. We wrapped ourselves in our blankets and turned our ribs to the rain. Soon a cyclonic blast got under our upturned canoe and whirled it away into the night. Fools, we should have tied it to our legs; there was nothing else to tie it to. I leaped to my feet, but the canoe was already off shore vanishing in the gloom We were in a desperate predicament. Nearly a mile of rushing icy water hissed between us and either shore, for the Nelson is a mighty river and this was one of its widest points. A hundred yards, however, would have made an equally impassable barrier for me, for I cannot swim. No, really. Seems unbelievable, doesn't it? I never learned. I suppose I am some kinds of a fool; few of us wholly escape that. You may imagine there was no more sleep for us that night; for we were facing death in one of its most hideous forms, slow starvation. There was no hope of rescue; few people pass that way, not one a month.

"Being an Englishman, the first question I asked was, 'How many meals have we left?' 'Three,' said my Indian stolidly. 'Can you swim?' I asked him next. 'Me swim little bit; far as throw stone' . . . and it was a mile to shore. We covered up again in our wet blankets and waited till dawn. Wait was all we could do; wait till dawn, wait then till dark, wait till death. Dawn comes early in Summer on the Nelson. Three o'clock saw the light. We sat on our bare rock watching the wind whip the whitecaps into scud. The wind began to drop out and by nine o'clock . . . six dreadful, torturous hours of watching . . . there was a dead calm.

"Suddenly I sprang to my feet with a yell. Far up the Nelson, coming apparently straight toward our barren islet, floated our own canoe, right side up, light and graceful as a swan. It seemed to me the most beautiful thing I had ever seen. Soon it became evident that it would be swept far to one side. A hundred yards from our stony refuge, and slightly up stream, a tiny point of rock lifted its head from the swirl. I seized the Indian by the arm and pointed: 'Can you swim to that, and then to the canoe as it passes? It's our only chance.' 'Me try'. The Indian stripped and plunged in. He had told the truth; he was a miserable swimmer. After a desperate battle he gained the rock. On drifted the canoe: it would come fairly close to him. Again the Indian struggled fifty meagre yards and seized it by the gunwale. Getting into it was impossible; that is a still-water trick. But my Indian frantically guided the canoe toward our prison. He couldn't make the landing; the V of the current at the head of the rock caught man and canoe and swept them wide. I had a fifty fathom cod line, which all canoe men in the Northland always carry for emergencies, and which is always kept neatly and smoothly coiled. I seized it and threw it from the coil as I never hope to throw again. The line fell squarely over the canoe: my Indian caught it and I towed man and canoe ashore. No, I wasn't nervous or shaky. We didn't collapse, or anything of that kind. We just ate one of our three meals with unspeakable relish, and paddled away.

"Another strange and providential rescue that came to me," continued John Semmens, reminiscently stroking his white beard, "was when I was a missionary in the far northern Lake Country. The approach of Winter found us foodless. For some reason the settlement had failed to send us provisions, even the necessaries of life, flour, bacon, sugar, tea, rice, beans, salt; everything else is a luxury. The Post larder was absolutely bare. We had only a fish net, and we couldn't live on frozen fish alone all Winter. We were three hundred and fifty miles from the nearest food; and we had to have it. Accordingly, I started out to get it with three men and three canoes. The Post supplies were so entirely exhausted that we did not dare take the bit of smoked fish that still remained; so we started out with no food whatever, hoping to be able to live off the country by getting game, fish and berries on the way. But the first two days we had found nothing, not even a fish or a grouse or a porcupine.

"We were famishing. I was in the leading canoe, of course, and on the next day an Indian hailed me from the shore. I paddled over to him, and with not a word of explanation he tossed into my canoe ten ducks and a number of fish. 'For you,' was all he said. After thanking him heartily I asked him, 'Where is your tipi?' He indicated that he and his family were camped at least a mile from the lake shore. 'You are hunting, then?' I said to him. 'Have you just killed these?' 'No, me bring. Me feel you hungry. When come to shore me see you far off.' 'How did you know it was I?' It was an unfortunate question for my pride as a woodsman. The Indian hesitated a moment and with perfect frankness replied, 'You ply paddle a little like greenhorn! I, a canoe man of many years practice.'

"On we dashed . . . lake and river and portage. All the Indian's gift was consumed and again we were starving. As we crossed a lake I saw smoke curling up from a lonely tipi on the shore. Our little flotilla turned to the smoke. At our call an Indian came from the tipi, and to my great delight I recognized an old Ojibway friend.

" 'Keewaydin-O-Kao (Man-who-makes-the-north-wind-blow),' I greeted him, 'what have you to sell me?' 'Nothing, Missioner. Me have only few berries; these me give you.'

"It was a cruel disappointment, but Keewaydin-O-Kao went on: 'Me have net set, sturgeon net. Sometimes get none, sometimes one. Now me go look at net. If get one, me give you half: if get two, me give you one. Me no sell.'

"Then in the graceful birch-bark, like his great ancestor, Hiawatha, he went

> "Forth to catch the sturgeon, Nahma,
> Mishe-Nahma, King of Fishes."

"We waited, anxious but with scant hope.

"At last, far down the lake, I saw the canoe gliding along on even keel, and Keewaydin-O-Kao in the very stern. That told the story. The canoe grated gently on the sandy beach. The Indian stepped out, and we helped him unload six enormous sturgeon. There must have been over seven hundred pounds of the delicious flesh. Reverently Keewaydin-O-Kao took off the red bandana that served him for a hat: 'All yours, Missioner,' he said, 'Indian no catch. Great Spirit send them to you. Me no take.' It was indeed a marvellous catch in a season of dearth; the great draft of fishes in the Sea of Galilee was not more opportune. The Indian's faith in the miraculous nature of the catch was absolute, and I had not the heart to shake it.

" 'If you are sure, Keewaydin-O-Kao, that the Great Spirit sent them,' I said to him, 'then take four of them as a gift from the Great Spirit, and dry and smoke them; and when you eat them by your tipi fire when the snow whirls and the world is white, think of the Great Spirit and thank Him. I will take two; more I do not need.'

"A few days afterward we reached the H. B. C. post, and knew hunger no more. We obtained abundant supplies and returned to our distant station with no more adventures."

"If you can believe that these two events were mere coincidences," said John Semmens gently, "I cannot." And the splendid old man thoughtfully took off his glasses and wiped a faint mistiness from the lenses.

LETTERS FROM THE HILLS

*The following letters were not intended for publication. The name of the writer is therefore withheld.—*Ed.*

" . . . *Geography is an art as well as a science . . . if we are to learn about it in an adequate manner so that others may participate in our knowledge, then we must use our hearts as well as our heads. We must be artists as well as meticulous classifiers, cataloguers and reasoners . . . the objection that the description of its Natural Beauty is outside the scope of Geography is not a valid objection. The picture and the poem are as legitimate a part of Geography as the map.*"

The Heart of Nature. SIR FRANCIS YOUNGHUSBAND.

"*Even where all men go, none may have stopped; what all men see, none may have observed.*" PRINCIPAL FORBES.

Seattle. July.

Dear T.:—I believe I was treated to as wonderful a sight as is given to a human being—and that was yesterday—the ever changing view of Ranier-Tacoma, a six-hour uplift while motoring from Paradise Inn to Seattle.

The afternoon was unclouded and at three we climbed into the bus with the best details of the splendid mountain towering above us in every huge characteristic. White it was, and tremendous with a veil of filmy blue mist enlarging its base which sprang up—tier upon tier of parkland glade—to the icefields. Thus, the merest softening of the lower four thousand feet of mountain, while above that, for six thousand, the glittering glaciers and snowfields poured out of the very sky.

One leaves Paradise Valley by a system of wonderful loops, to the sound of unnumbered waterfalls. It is just a huge welter of sparkling sunlight, star-showers of flowers, melting snow-drifts, and dashing cascades. The road twists and twines around the huge buttresses of the mountain. One runs out on and rounds dizzy points and gazes upon staggering views into blue depths where glacial torrents flow down their canyons. Always above is the tremendous height of the mountain, reeling about in the sky as one plunges in and around corners. Now it is in the front, now behind, and, as one descends, climbing the sky in lonely immensity.

The Government has built the road and claims it to be as wonderful as any in the world. I might compare it with the Stelvio Pass into Italy, but the country here is more rugged. At one place, you come out on a spur two thousand feet perpendicularly above the boiling river and gaze at the V-shaped gulch of the Nisqually, up to where the glacier, eleven thousand feet above, begins to tumble out of the sky.

I am making a peculiar simile when I say that Ranier-Tacoma is approached and left by Wall Street. What I mean is this: the road is cut through a forest of Douglas fir, the trees of which not uncommonly reach two hundred and fifty feet and commonly rise to two hundred feet. One is thus speeding up or down a forest canyon instead of walls of brick. Into this narrow opening the mountain flashes, as Trinity steeple would flash into Wall Street, provided that august thoroughfare twisted like a tortured serpent.

At Longmire, which is at the Park line, the mountain has begun to assume its more distant features. The sea-green-blue of the huge crevasses is not so easily made out and the great glaciers of the west face begin to appear, Tahoma and South Tahoma and the Kautz glaciers. The main crest of the mountain begins to fall behind Peak Success and even Liberty Cap at the northern end begins to appear. A little later you get all three summits as the beginning of the crowning glory approaches; that is the view one has from Olympia and Yeln Prairie, where the mountain is about forty miles away.

Last evening the sight was half divine and held one spellbound. We had been cutting along the sides of spruce-covered ridges, when suddenly, over the flats, the great mountain rose miraculously—like a soft, ethereal beacon—its mantle of glaciers rose colored in the setting sun. The Willis Wall—over which is pushed at intervals great sections of an ice-cap four hundred feet thick—hung like the shadow of a thought, a seemingly gentle depression on the north face. The whole massif began to take on that stately templed yet pondrous grace that one views from Tacoma and Puyallup. Gradually the mist wound about the base and the whole mass was lifted up off the earth like a flaming sacrifice. As the distance grew, it became fainter and fainter. A misty shell-pink patch hung with exquisite shapeliness in the sky, until, as we neared Seattle, at seventy-five miles, it faded white and cool into the upper reaches of the twilight.

J.

Portland. July.

Dear T.:—I think someone has had unfamiliar sensations during the past forty-eight hours. The ascent of Mt. Hood is not as easy as it might be and a great deal less so than is made out. I discovered from the guide that the majority of ordinary tourists like myself seldom get beyond Crater Rock, and that the last fifteen hundred foot ice-wall is not at all popular.

We left Government Camp at seven o'clock in the evening and proceeded to timber line, where we camped for the night. We found a cabin with two tiers of bunks built into the wall and quantities of thick, torn and dirty comfortables and blankets. I, for my part, can only say that some insect was imprisoned in my pillow, for the last thing I can recollect before sleep, was a painful buzzing in the depths, like that of a fly caught in a spider's web.

On the long climb of four miles to timber line, we had gorgeous views of Mt. Jefferson rising over the burnt area of mountain timber behind us. In the shattering of its crater, a great rock pinnacle has refused to go down before the forces of Nature and stands above the snow crown like a red beacon in the melting sun, with the glaciers sweeping down from its feet.

On rising at two a. m., I shall never forget the sight that met my eyes. A round silvery moon hung in the air. Great white drifts of winter snow lay twisted in the hollows. Grotesquely shaped Douglas firs stood about; black, in groups, or straggled off up the mountain in a stunted and gnarled procession, until, a few hundred yards on, they ceased. A fire blazed, casting ruddy light upon Z——, who was making coffee.

We started off, upon one of the crusted drifts that twined down the hollows, in relation to the summit of the mountain as spokes to the hub of a wheel. Z—— led with ice-axe; we followed. We discarded the lantern for the light of the moon. By and by we passed out from among long patches of rock and scree between which ran the avenues of snow. It was then a long tiresome drag over the snow slopes, hard and slippery as ice. The ascent became steeper; patches of rock, which looked like dots from below, are larger in extent than our farm, even to sixty and eighty acres. The angle of ascent became every moment more steep and frequent rests had to be taken; breath was a little short.

The top of the mountain is as if one looked into a gigantic teacup, and one discovers that the summit is simply the remains of a crater from which the south wall has been blasted away and from which the snow-fields stretch down. Crater Rock, a huge pyramid of 1000 feet, alone is left sticking out in the centre and connected with the base of the wall behind by a causeway of snow with steep angles pitching down on each side. One climbs into the ampitheatre through the vast gap in the southern retaining wall. The slope grew steeper and many steps were cut. We made a shoulder of Crater Rock, where we melted snow for water; this is done by lowering it, in a tin can, into a boiling steam-vent of sulphurous fumes that come hurrying up out of a cavity in the rock. It was eight a. m. I thought that here the worst of the climb was over. There remained only the snow arête to walk over to the base of the steep snow and ice slope that led to the top. I would have sworn that five hundred feet was its height. It looked so from below. Treble it, I had to. Step cutting was necessary. It was real climbing and we reached the summit at noon.

The view was overpowering. Words won't take it in nor give it out. Hood pitches down four thousand feet to Eliot glacier, this great northern precipice corniced slightly, so that the thick cap of snow we stood on seemed to overhang space. In the south, Diamond Peak, Broken Top, Three Sisters, and Jefferson floated like great white birds in a sky absolutely clear. To the north, Tacoma, 160 miles away, rivaled in appearance St. Helens and Adams, though these latter—across the Columbia, which showed clearly—were only sixty miles off. Everywhere was a tumbled sea of mountains, blue and green; rivers winding like a map; the wheat fields of Eastern Oregon spreading to the horizon. The curvature of the earth prevented our seeing Mt. Baker or Shasta.

We shot down over the snow like a sky-rocket. The last long slope, that took three hours to negotiate, passed in a moment. I have never had so much fun in my life as at glissading. We reached Government Camp in one hour and fifty-nine minutes from the summit, possibly a record descent.

J.

Glacier House. British Columbia. August.

Dear T.:—Tonight, I believe I can say I have paid my tithe to the Alpine World. At least I know what it looks like. On Hood it was different. You were so immeasurably above and beyond your vicinity that it was like a magnified view from a main summit of the Catskills, out over oceans of ridges and heaving crests. The only other occupants of the universe were fifty and one hundred and fifty mile neighbors, such as St. Helens, Adams, Ranier and Jefferson; but they are not mountains, they are great balloons striving to rise from their surroundings, half the time all mixed up with the clouds. One doesn't know which is rosy snow and which is radiant cloud. Ranier-Tacoma from Yeln Prairie, in the evening, was the most sublime sight I have ever seen.

But here, you were a part of the sea. The whole compass was clear as daylight. Mt. Bonney I thought grand beyond imagination; Sir Donald stupefying in its upward sweep; but, to suit my paper-theories, it was Mt. Dawson that justified expectation. I had always picked upon it in books as the supreme being in this part of the Selkirk Range, and it did not fall short of it in the slightest degree. Sir Sanford showed up, pure and white, like a tilted tent; Iconoclast, dark; and Fang Rock, taking one's fancy with its wonderful entourage of snowfield and glacier.

I think I could have gone to the top of Mt. Afton, but I lost my nerve. I was alone, my ankle weak and a storm coming. I am not familiar with such work, and, though I may have been over-cautious, I thought it best to turn back. Mt. Bonney was the great surprise. I had no idea of its grand proportions, its indescribably beautiful veining pricked out in new snow, and the tremendous fall of its forbidding cliffs to the glaciers below.

J.

Lake Louise. Alberta. August.

Dear T.:—I shall never rest until I get out here with you. I believe I could learn to climb so that I would not be a nuisance to any party. I went to within about four hundred feet of the summit of Mt. Avalanche, yesterday morning, but somehow got into a pocket which brought me to a pile of rocks I could not surmount. If I had had all day I might have done it; as it was, I came down in stocking feet, having torn the entire sole off one and half off of the other shoe in slipping over rocks. I can't say I wasn't scared.

The Rockies yesterday were superb. We were treated to lights and blue-black thunder-showers that covered the whole world in strange sombre glory. I rearranged my recollections at once. The Selkirks are beautifully grand; the Rockies are dramatic. The Selkirks look as though they had, in repose, drawn cloaks of ice and snow over them and so lain down to sleep. The Rockies appear as if, from a great distance, some giant had stood and hurled great blots of white paint at them. As one ascends the Kicking Horse, the glaciers of Mt. Chancellor cling at such an absurd angle. Mt. Vaux follows it up with that snout pushing out from the sky. There seems no reason for the glaciers that sweep out from the tops of the President Group, but last night, they were bathed in soft haze and rosy light;—forgive me—the Rockies, last night, had an element of stage scenery about them, filling one with wonder and fear. The sources of these glaciers are less apparent than in the Selkirks, and, when they jut out far above among ruddy crags, it is breath-taking.

J.

Lake Louise. Alberta.

Dear T.:—Am happy to say that, with W——, I reached the top of Mt. Whyte today,—which to me is a very big event in my life. The view was magnificent, caldrons of boiling cloud on all sides, with sudden explosions of sunlight on Temple, Lefroy, Hungabee, Victoria and many of your friends. I had no idea that the rock would be so utterly rotten, but the experience was valuable, as it gave me an idea of what you Alpiners call an easy climb. God knows what you would consider a hard one! For my part, there were places I inwardly insisted I never could get up, although on coming down they didn't look so awful. It's a little introduction, at least, and I'm better satisfied to say I've been on the top of Whyte than that I tried Afton and Avalanche. Selkirk rock is fine; I would make Avalanche now with proper shoes, but, in feet practically bare, No!

J.

Eastward-bound. August.

Dear T.:—We made our bow to the Rockies last night. The conclusion was quite as impressive as the introduction. The sky a pure silver-grey, shading toward deep blue at the top of the heavens. Against the background and between the more neighborly crags of violet rock, that shoot up above the train like a line of foam, one occasionally caught glimmers of the peaks of the Divide. The peaks of the eastern Rockies are to me most dramatic. Ribbed and banded by the sparse growth of spruce and lodge-pole pine, their absurd crags and steeples assume the shapes of a nightmare. Here they lean toward one another, supporting themselves on their elbows; there, drawing apart and throwing great thumbs of naked rock into the sky. The train runs toward them and they swell and loom, until one is directly below; then, as one departs, the foreshortening ceases and they mount the sky again and climb to dizzy heights.

A brilliant half-moon chased us, leaping along the top of the battlements or throwing full light upon a small glacier or snowfield, stuck to the tip of a peak at some impossible angle, or suddenly hidden behind some lofty sky-pilot. We are nearing Moose Jaw and the plains, in their way, are almost as impressive.

J.

Northern New York. February.

Dear T.:—Behold the Skipperee, an innocent looking little hill; yet I declare that only yesterday I had several hours of real discomfort on the descent of this nine hundred foot knob. We were treated to a wild blast from the north, that caused the whole countryside to boom and roar like a hollow drum, and the hills and flats to smoke with a furious drift of light snow. Everything would suddenly leave one place and move swiftly over to the next, like white foam. It was two below zero at noon,—and with that gale!

The Rector told us from the pulpit, during the morning sermon, that we were a set of hypocrites and bluffers that outdid the whitened sepulchres; that we had the light and wouldn't see, and that Heathen Chinese were away up in the comparative scale. Feeling utterly devoid of hope, I gathered the elements about me, put on some heavy clothes, and started with three youngsters to do honor to the hill. We were blown up into the bare woods and open pastures, the snow rising in whirlwinds that stalked off before or toppled over us. I have never in my life known such a wind. It tore branches off the trees above our very heads; one leaned against it and it supported or threw one to the ground. We could hardly breathe; once the breath was in, it was trapped. Opening ones lips produced at once a hundred jews harps and steam-boat whistles through the teeth, but soon our faces became so numb that we could not open our lips. Every ten feet we would crouch in the snow in a huddle and turn our backs to the gale. This enabled us to get our breath. The drift was piling up in hollows five or six feet deep. We could not hear each other shout at a few paces distance. It took fifty minutes to drop down that slope and we were nearly frozen.

We warmed up as best we could in an old, tumble-down hay shed on the edge of the woods, but I am still recuperating with cheeks cut by snow particles in the blast.

J.

Northern New York. May.

Dear T.:—Yesterday was Ascension Day. I shall never forget it. Nature gave herself over to chaotic abandon. We awoke to a cold, overcast sky. Hills vividly green had nightcaps of pure snow. The tenth of May!

I walked seventeen miles over the unsettled reaches of the Grafton plateau. The Petersburg Ridge looked down on me and I looked down on all the world besides. There went about, aimlessly, bits of strayed and stolen sunlight in between a series of strange blue-black squalls. They wandered over hill and valley, still exploding on the snow of some far mountain-top, in bars of dazzling purity. The contrast to the purple gloom of hemlocks clinging to the flanks was positively startling.

Then there were vivid greens of valley meadows, rows of budding willows by the brook, like sets of yellow candles. At one moment we were on an open hilltop; the next, we gathered night about us in the depths of stunted hemlock, spruce and pine. Again we crossed an upland swamp, coral-red with budding maple; the water black, the snow falling on the crowded bushes with faint scratching noises.

The streams flashed cold and clear. Great sweeping views out across the Hudson valley, with the faint far rimming of the Adirondacks and the Catskills. Sweeping skirts of snow were draped across the sky.

It was a day to be remembered.

J.

THE WANDERER IN OUR NATIONAL PARKS*

*The following notes are furnished by courtesy of the Department of the Interior, to whom indebtedness is hereby acknowledged.

Mount McKinley National Park.

Pack-train service into Mount McKinley National Park, Alaska, will be available this summer from McKinley Park Station on the Alaska Railroad. Dan T. Kennedy, of Nenana, Alaska, has been given a permit to operate this service, which will include tourist accommodations in tent camps to be erected at Savage River, Igloo Creek and Toklat River, distances of 12, 30, and 50 miles, respectively, from the railroad.

The trip to the Savage River camp will be made by a 4-horse stage over a rough wagon road but beyond Savage River visitors must travel the main Park trail on saddle horses in regular pack trains. The trip from the railroad to Toklat River and return constitutes a six-day trip of about 100 miles, costing approximately $128 per person for parties of six or more.

This trip affords opportunity to view Mount McKinley, rising 20,700 feet, which towers higher above its surrounding base, altitude 3,000 feet, than any other mountain in the world, and the immense herds of caribou and bands of mountain sheep which roam the park. Hunting is prohibited in the Park.

The Banff-Windermere Highway.

On June 30, 1923, the Banff-Windermere Canadian Highway will officially open to travel the first motor road to be constructed across the Central Rockies of Canada. The construction of this road completes the last link in a great 6,000-mile system of International Park-to-Park Highways, touching twelve National Parks in the United States and three in Canada in a "Grand Circle Tour."

Motorists from the Canadian prairies may now travel west from Calgary, Alberta, passing through the Banff National Park and the magnificent Alpine scenery of the Central Rockies, touching Banff, Lake Louise, the Valley of the Ten Peaks and Moraine Lake, Paradise Valley, across the Vermilion Summit and through Kootenay National Park to Invermere, B. C. From this point direct connections can be made via Cranbrook to Spokane and Seattle, Washington. Mount Rainier National Park, Washington;

Crater Lake National Park, Oregon; Lassen Volcanic, Yosemite, General Grant and Sequoia National Parks, California; Zion National Park, Utah; Grand Canyon National Park, Arizona; Mesa Verde and Rocky Mountain National Parks, Colorado; Yellowstone National Park, Wyoming; and Glacier National Park, Montana, may thence be visited in the order named.

From Glacier National Park the road runs north to the International Boundary and thence to Macleod and Calgary. From Macleod a diversion of 35 miles gives access to Waterton Lakes Canadian National Park, which adjoins Glacier National Park in Montana north of the International Boundary. Camp site and service stations will be found at convenient points along the road.

A license fee is charged motorists to drive through Banff and Kootenay Canadian Parks and a nominal license fee is charged in the majority of the National Parks in the United States.

Pipe Spring National Monument.

On recommendation of the Secretary of the Interior, President Harding on May 31 established by Presidential Proclamation the Pipe Spring National Monument, Arizona, containing 40 acres. The Monument was created primarily for the benefit of motorists traveling between Zion National Park, Utah, and the North Rim of the Grand Canyon, Grand Canyon National Park, Arizona, as it contains the only pure water along the road between Hurricane, Utah, and Fredonia, Arizona, a distance of 62 miles.

Pipe Spring is famous in Utah and Arizona history. It was first settled in 1863 by Dr. James M. Whitmore, who owned the place and was later killed by Indians. President Brigham Young of the Mormon Church purchased the claims of the Whitmore estate in 1870 and made it ranch headquarters for the rancher in charge of a herd of cattle belonging to the Church. In the spring of 1870 there was erected a stone building, known as "Windsor Castle," with portholes in its walls, as a refuge from the Indians. It was also a station of the Desert Telegraph, the first in Arizona.

At present there are two old stone buildings and it is planned to have the old fort restored as it was formerly with a wall connecting the two buildings. Pipe Spring is within the Kaibab Indian Reservation and is involved in certain private claims. It is the intention of public-spirited citizens in Utah to recompense the present claimants for improvements made in order that the Department of the Interior may take over the active administration of the Monument, which will serve as a memorial of western pioneer life.

Mesa Verde.

In Mesa Verde National Park, Colorado, the visitor this summer may behold for the first time the skeletal remains of one of the prehistoric inhabitants of this region as he was laid out in his grave centuries ago.

These human skeletons were uncovered in an aboriginal cemetery near the southeast corner of Pipe Shrine House last summer. All the skeletons that were found were well preserved, considering their antiquity, and had been buried in an extended position on a hard clay bed. They lay on their backs at full length with legs crossed and heads oriented to the east, generally accompanied by mortuary vessels of burnt clay and other objects. These vessels once contained food and water, the spirit of which was thought would be suitable food for the spirit of the defunct.

Le Conte Memorial Lectures.

The fifth series of the LeConte Memorial Lectures, an annual feature in Yosemite National Park instituted by the University of California Extension Division, will be given in Yosemite Valley between June 19 and July 13. The lectures, which are free to Park visitors, are as follows:

The Sierra Forest: June 19, 21, and 22.
  Three illustrated lectures by Walter Mulford, Professor of Forestry, University of California, in the Government Pavilion, at 8 o'clock.

The High Sierra: June 26 and 28.
  Two illustrated lectures by Joseph LeConte, Professor of Engineering Mechanics, University of California, at the LeConte Memorial Lodge, at 8 o'clock.

River and Lake Fishes of the West: July 3, 5, and 6.
  Three illustrated lectures by John O. Snyder, Associate Professor of Zoology, Stanford University, in the Government Pavilion, at 8 o'clock.

Geology of the Sierra: July 10, 12, and 13.
  Three illustrated lectures by James P. Smith, Professor of Paleontology, Stanford University, at the LeConte Memorial Lodge, at 8 o'clock.

BOOK REVIEWS

Waldo, Fullerton. *Down the Mackenzie Through the Gre*
The Macmillan Company, 1923.

Some years ago the reviewer received from a friend an in to him was the most intriguing of his life, and which was decli pelling reasons, with deeper regret than any other within his m invitation was to undertake by canoe a trip down the Athaba kenzie Rivers to the mouth of the latter, and to return to the h in a whaler. This expedition, with its marvelous interest, wit adventure, with its thrill of strange scenes and strange peopl been made in craft more seaworthy and substantial than a ca the kindness of Mr. Waldo in furnishing transportation. Th this charming book of travel and vivid human document title

The book is singularly and brilliantly pictorial and realistic possesses the rare faculty of culling from his experiences jus and incidents which will excite and hold the interest of his book will frequently be read at a sitting through sheer reluct down. We see the forested river banks, the desolate slash timber, the tossing waters of the huge treacherous lakes lash wild Northern gales, the encroaching mountains of the lower the God-forgotten H. B. C. posts and the villages, few and fa the Great Lone Land. We hear the starved snarling of the wre dogs and the symphonic humming of the omnipresent myriads of We feel the burning stabs of mosquitoes and green-eyed "bull-dog if one may be allowed to conjecture the two most poignant exp the author in these lonely sub-arctic lands, there is a strong te mention first, flies; second, dogs.

The people of the Northland are splendidly drawn, and a tribute is paid to the devoted missionaries and to the magnificent Police, unquestionably the finest body of men in the world for dev difficult duty and for efficiency in its performance. An unexpected re is the inefficiency of the Hudson's Bay Company in its organization of port and development. The habits of centuries are hard to break; an successors to the original "gentlemen adventurers trading to Hudson's clearly find it difficult to turn from exploitation and oppression to upbuild and progress. Perhaps there is method in their madness. The H. B. derives its profits from wild men and wilder animals. To this wildness th spread of an efficient civilization is a deadly foe.

Shafts of light humor sparkle through the book; and the reviewer notes especially the recrudescence of the erstwhile despised pun as an accepted literary form. There are a few misprints which might have been obviated by more careful proofreading.

B. W. MITCHELL

Saunders, Charles Francis. *The Southern Sierras of California.* 363 pages with 32 photographic illustrations by the author. Houghton Mifflin Company. 1923. Price $4.00.

In a book that is pleasant to read as vacation days approach, Mr. Saunders takes one from the highways to the byways of Southern California, on the unfrequented trails of the Southern Sierra. One begins afoot in the Sierra Madre and learns the geography and topography of Southern California rivers, *"arroyos"* that sink through their beds and travel under ground; one is taught what the Sierra Madre is, a granite bastion between the desert and the coastal plain, with San Antonio, "Old Baldy," the highest peak in a crest extending from the western mountains of Ventura to the Cajon Pass, which divides it from the San Barnardino Range.

One is led through the Santa Barbara National Forest, through the Pass of Tejon, and up Mount Pinos; and then to higher peaks, San Antonio and San Gorgonio the top of Southern California. Then the Desert, with the Salton Sea, and the "Rim of the World" road in the San Barnardinos.

There is much of interest in reading of the passes of the pioneers, Frémont's, the Cajon, the Pass of Our Lady of Refuge, and the Lost Pass of San Carlos—old routes from the desert into a veritable Garden of Eden; routes on which a traveller eastward bound was indeed a curiosity.

And then the flowers; flowers that preserve for us the names of botanists of a century ago, Bernard M'Mahon, Thomas Nuttall, Dr. C. C. Parry, Dr. Edwin James, Dr. Albert Kellogg—physicians preponderating—who crossed the Continent in search of the unusual and beautiful.

There is a wealth of folk-lore and of historical interest in the book, much of which is but seldom remembered. The illustrations are excellent and one wishes for but one addition, a map.

J. M. T.

Jessup, Elon. *Snow and Ice Sports.* A Winter Manual. 293 pages with frontispiece and eighty photographic illustrations and diagrams. E. P. Dutton and Co. 1923. Price $3.50.

For many people, to whom Winter means a time for staying indoors and thinking of ever-mounting coal bills, this volume by a former associate editor of "Outing" will open a new field and present many opportunities for sport during cold weather days. First and foremost is considered the importance of proper dress, and directions are given which, when followed out, assure one a degree of warmth in zero weather which does not necessitate an outfit that is cumbersome or unwieldy. A person does not have to look a human mattress in order to keep warm out-of-doors.

Skiing and snowshoeing, sports that are growing throughout our Northern States, are discussed from the point of view of the beginner, simple diagrams and illustrations supplementing the description and technique. Winter sports are many and varied, apparently designed for many temperaments; tobogganing, ice fishing, and ice boat sailing afford activity for appropriate localities, while figure skating, ice hockey, and sailing with skates afford more familiar types of amusement. Special chapters of this attractive book deal with features of winter sport of a much more strenuous character; among these are snow camping, walking on ice-creepers, and winter mountaineering, as is now extensively indulged in by the many outing clubs of New England.

A chapter acquaints one with curling, a game played in Scotland for five hundred years, a leading winter sport in Canada for over a century, and gaining popularity in the United States, especially in parts of the Middle West. The implements of the game are a curling stone, weighing over forty pounds, and a household broom; in addition, some skill and a notable Scotch accent are advantageous. Many of the sports described depend upon local conditions for their proper indulgence, but wherever winter affords a reasonable amount of snow and ice one may find valuable hints in this manual for the enjoyment of the winter outdoors. It is a guidebook to the best things of winter.

J. M. T.

GEOGRAPHIC NEWS AND NOTES

Awards of the Royal Geographical Society have been made as follows: The Founder's Medal to Mr. Knud Rasmussen for his exploration and research in the Arctic regions during the last twenty-five years. The Patron's Medal to the Hon. Miles Staniforth Cater Smith, for his explorations in the unknown interior of Papua. The Murchison Grant to Captain A. G. Stigand, for his map of Ngamiland. The Back Grant to Mr. B. Glanvil Corney, for his studies in the historical geography of the Pacific. The Cuthbert Peek Grant to Messrs. R. A. Frazer and N. E. Odell, to assist them in continuing their explorations of Spitsbergen. The Gill Memorial to Captain Augiéros for his journey in 1920-1921 from Algiers to Mauritania.

The Trustees of the National Geographic Society have authorized a tablet at Camp Clay, Cape Sabine, in the Arctic, in memory of the eighteen men of the Greely expedition who died there in 1884. Major General A. W. Greely, retired, dean of living Arctic explorers and leader of the party, now lives in Washington. The tablet is one of a series the Geographic Society will place as memorials to Americans who have made history in Polar explorations. Memorials to Rear Admiral Peary, discoverer of the North Pole, and to Rear Admiral Charles Wilkes, discoverer of the Antarctic continent, have already been erected in Arlington National Cemetery, Washington. The tablet to the Greely party will be carried by Donald B. MacMillan when he starts north in June for further explorations of the Arctic, and it will be placed in position by him on the rock cliff facing the camp.

Captain Donald B. MacMillan, who will sail June 16 on the little schooner Bowdoin to resume his Arctic explorations, announced recently that one purpose of the expedition is to determine whether another Ice Age is beginning, as the advance of glaciers in the last seventy years would indicate. Other purposes are study of terrestrial magnetism and atmospheric electricity, botany, ornithology and obtaining a series of photographs of bird and animal life. Thirty thousand feet of motion picture film also will be in the Bowdoin's outfit.

Long copper strips are being attached to the hull of the vessel to be used for a ground connection for the radio receiving and transmitting station which is being installed.

Whether communication through the Northern Lights will be possible has been hotly debated. This experiment will answer the question, as the MacMillan party is going far beyond the lights to winter either at Cape Sabine, if ice conditions permit, or at Jones Sound. The former is about eleven degrees from the North Pole.

The British Colonial Office, as reported in the London *Times,* makes the following announcement respecting the *Discovery's* new voyage: The secretary of state for the colonies has appointed an executive committee to control the researches recommended by the Inter-Departmental Committee on Research and Development in the Dependencies of the Falkland Islands, and in particular the investigation of the question of the preservation of whales and of the whaling industry, which has been subject to government regulation since its inception nearly twenty years ago. The *Discovery* is Captain R. F. Scott's old ship, in which also Sir Ernest Shackleton served. She will be principally employed in the waters of South Georgia and the South Shetlands. It is not anticipated that she will be ready to start before next year.

The Third Asiatic Expedition of the American Museum of Natural History, under the leadership of Roy Chapman Andrews, has recently unearthed a fossil carnivorous dinosaur in the Mongolian desert. The giant, lizard-like reptile has not been identified with other known species, but belongs probably to the Triassic period (4,000,000 to 10,000,000 years ago). The legs are nine feet long, almost as large as the great herbivorous brontosaurus, some specimens of which in American museums have legs ten feet long, a total length of 50 to 90 feet and a weight of 20 to 40 tons. Their brains were comparatively minute, a fact which perhaps contributed no little to their extinction.

Bones discovered and preserved by scientists show that the same forms of prehistoric animals and reptiles—mastodon, woolly rhinoceros, dinosaur, all monsters of ages long past—existed both in Europe and America. It is probable they had a common home in Central Asia and from there wandered to what is now Europe and, across a land barrier which once connected Alaska and the Asian Continent, to America.

Much data went into that deductive reasoning, all based upon the theory of evolution. As one instance, the horse of today has a single toe, or hoof, but the scientist knows that millions of years ago it was a five-toed animal; examination of modern horse shows that, and his evolution has been traced back to a three-toed ancestor through the fossilized remains of ages ago. However, the "root type," that is, the earliest form of horse, the animal of five toes, has never been found in the well investigated fossil deposits of Europe or America. According to Professor Osborn's theory, he had three toes when he left Central Asia and migrated, during thousands of years, to other parts of the world. The Third Asiatic expedition found last year fossils of a four-toed horse, which supported this theory, and it confidently expects to find remains of his five-toed ancestor.

Last summer they found remains of dinosaurs like those which have been found in Western America and also the skull of a Baluchitherium, probably the biggest land animal the remains of which have ever been discovered, which showed the same animal types existed four or five million years ago along the Altai range of mountains in Mongolia as in India.

This summer's expedition will devote itself mainly to paleontology, or the study of extinct beings, and geology, and can only touch the resources of this vast prehistoric storehouse in those respects. For the leader of the expedition states the Gobi desert is the greatest fossil bearing country in the world and can become the scene of hundreds of years of research work and scores of expeditions.

The six American scientists in the party are going out in their five American motorcars, supported by a supply caravan of seventy-five camels, to dig and explore what they confidently believe was once the Garden of Eden, the tropical, rich valley abounding in animal and plant life in which the animal known as man had his evolution from a lower form of life and from whence he wandered to all parts of the globe.

Recurrent reports that Easter Island had sunk beneath the Pacific during the intense earthquakes of last November have been proved unfounded. The fishing schooner Falcon, which left for the island in February, returned, reporting that all was well.

The island, 2500 miles west of the Chilean coast, has a population of about 1200. It is the easternmost inhabited member of the Polynesian group and remarkable for giant pieces of sculpture, apparently the work of a prehistoric people,

The American geologist, Dr. Bailey Willis, recently returned from the islands of San Ambrosia and San Felix, reporting evidences of the havoc wrought by the earthquake, and the captains of several ships reported they were unable to find Easter Island.

Buenos Ayres scientists who have examined the alleged *Tertiary skull* discovered by Dr. J. G. Wolfe in Patagonia, claim it is merely a curiously shaped stone of no scientific value.

ACTIVITIES OF THE SOCIETY

WHERE THE MOUNTAINS WALKED

JOSEF WASHINGTON HALL. (Upton Close.)

A seismic catastrophe of unprecedented magnitude was described for the Society, on Wednesday, April eighteenth, by Mr. Josef Washington Hall, formerly of the International Famine Relief Commission in China.

The great earthquake which occurred in December, 1920, in the Kansu Province, involved an area of 100 x 30 miles containing ten large cities and numerous villages. The region is situated in the loess belt, the soil being composed of clay and powdered quartz. The region is one of previous seismic disturbances, a similar catastrophe being recorded 1200 years ago, during the Tang dynasty, and laying waste to a great area some 200 miles of the present scene.

Mr. Hall told the story of mountains that moved in the night; of landslides that eddied like waterfalls, crevasses that swallowed houses and camel trains, and villages that were swept away under a rising sea of loose earth. Loss of life was very great as many of the inhabitants live in cave dwellings.

(For a more detailed account, readers are referred to an article by Mr. Hall, which appeared in the National Geographic Magazine, XLI, No. 5, My 1922.)

WITH ROOSEVELT IN SOUTH AMERICA

GEORGE K. CHERRIE

For an understanding of the route of the Expedicão Scientifica Roosevelt-Rondon, of 1913, described on Wednesday, May second, by Mr. George K. Cherrie, ornithologist and explorer, a description of some salient features of South American topography is of value. The Andes mountains form a high continuous chain along the Pacific coast and are a barrier to extensive river formation on the western slope. Hence most of the drainage of this Continent is toward the Atlantic, through the Orinoco, Amazon, and Paraguay basins. The head-waters of the Paraguay and the southern tributaries of the Amazon are separated by a high plateau, seldom visited, and at these river sources occur the greatest equatorial forests of South America.

From Buenos Aires, the Paraguay river was ascended to Asuncion, and the river followed to its sources in the highland wilderness where the savage Nhambiquara-land was crossed to Amazon sources. Here, the expedition divided, one party under Miller descending the Gy-Parana and the Madeira, a second party under Fiala voyaging down the Papagaio and Tapajos, while the main expedition, including Col. Rondon, Mr. Cherrie and Mr. Roosevelt explored the Rio Roosevelt—"the River of Doubt"—whose source had previously been visited by Col. Rondon. The Roosevelt party met with intense hardship in travelling to the Amazon, much of the country being inhabited by hostile tribes, and the river navigation made difficult by rapids and cataracts which destroyed canoes and provisions. Illness of members of the party slowed the pace, and it was only with great effort that the Amazon was reached. Mr. Cherrie illustrated his talk with a number of splendidly colored lantern slides, vividly portraying the tropical rivers, forests and jungles. Many of the pictures assumed an added interest in including conventional and unconventional views of our late great President.

SPRING OUTINGS OF THE SOCIETY

On account of a rainy day the walk which was arranged for April 14th, had to be postponed until may 5th, on which date a party of about twenty-five gathered at the Sixty-ninth Street terminal, taking the 1.58 Sharon Hill trolley to Oak View Station on Darby Creek.

The afternoon was ideal, balmy, and yet with a suggestion of the warmer sunny days that soon would follow. It was hard to realize that after less than a ten-minute ride we should be in such a secluded and picturesque valley. The trees were just putting out their early leaves with that delicate green tinting, and the ground was well carpeted with the spring flowers.

We were reminded of the early days of our country by some of the old mills and houses, but particularly by an old log hut, built in the time of William Penn. It is now occupied by two old bachelor brothers named Evans. Our party was much interested in inspecting it and listening to a talk about its history, given by one of the brothers who was the housekeeper. He also spoke of the few families who for several generations had occupied this region.

The cabin was immaculate, and the small yard and garden quite picturesque, making a charming foreground for the whitewashed cabin.

After sauntering for about two hours and a half along the banks of the creek, with its small waterfalls, rapids and pools, we arrived at North Springfield, where we took the trolley back to our starting point.

All of our party felt well repaid with the afternoon's outing.

The second trip was taken one week later, on May 12th, the objective being Perkiomen Valley.

Over forty members and their guests gathered at the Reading Terminal, and boarded a special car on the 8.36 train for Norristown, where we found two auto busses waiting for us, which took us to our first point, the DeKalb Nurseries, situated on the high ground in the eastern suburbs of Norristown, overlooking the charming Schuylkill Valley and the neighboring hills.

We found Mr. Adolph Muller waiting for us, a photographer was also on hand, and Mr. Muller had us all grouped together under a flowering Japanese cherry tree for a picture, a copy of which was presented to each member through the courtesy of Mr. Muller. About an hour was spent in the nurseries inspecting the trees, shrubs and plants, under the instructive guidance of Mr. Muller.

Leaving the nurseries we proceeded to Germantown Pike. The clouds had gathered and we had quite a shower that continued until we reached the old Presbyterian Church at Fairview. After sitting in the busses for a few minutes the shower passed over and we all gathered in the church building, where we listened to Miss Mary S. Holmes and Mr. James Pennypacker give two very good talks on the history of the church and its neighborhood.

Our next stopping point was the old parish of St. James' Episcopal Church, Perkiomen, at Evansburgh. The original church being built about 1720 and the present building in 1840.

The rector, Mr. Scofield, was most hospitable and gave us a very instructive description of the early days of the parish, standing by the memorial stone which marks the sight of the first church building. Mr. James Pennypacker followed with a few remarks pertinent to the church and the surrounding country.

After eating our lunch on the church grounds we again entered the busses and resumed our journey to Collegeville, following the beautiful Perkiomen Valley to quaint old Schwenksville, and a drive up Spring Mountain, getting that wonderful view over the valley which was particularly charming in the soft, hazy light of the afternoon. A short walk through the woods to the ringing rocks, back to the busses, where we entrained for our return trip to Norristown. Finding a special car awaiting us at the station, we were switched on the 5.57 train for Philadelphia, which was reached in due season.

The day was a most successful one and will linger long in the memories of those who were fortunate enough to be of the party.

NOV 19 1923

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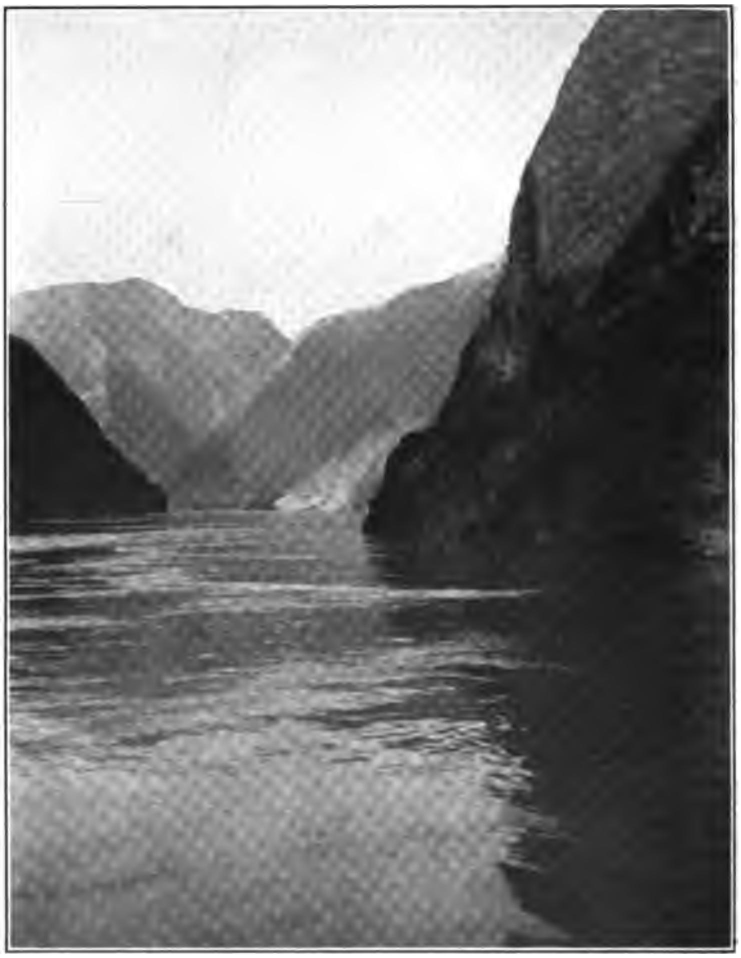

Fig. 1.—YOUTHFUL GORGE AT TSING SHIH TUNG, CUT IN WUSHAN LIMESTONE

THE GEOGRAPHIC SETTING OF CHENGTU

By George D. Hubbard

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Introduction. Geographically, China has great reason for entering into world problems. While in area she is much smaller than the British Empire, yet in point of numbers she merits as large a place in the thought of the world as Britain; and in point of cities she has as large ones, and as many large ones, save for the world's metropolis, as has the Empire.

Chinese cities are the beginnings of great commercial and industrial centers. With the coming of new light into China, and with the extension of railroads, her 400,000,000 of industrious, intelligent folk will become a market capable of absorbing prodigious quantities of articles produced elsewhere, and of producing, equally abundantly, native products which the Occidentals want. Among the great centers to come into play as soon as China gets a stable government and enters into her commercial and industrial youth, is the famous old capital and center of learning, the "Paris of China," Chengtu.

Chengtu an Old City. From earliest times a village or minor trading town, a harbinger of the present capital, has occupied its somewhat central site on the Chengtu Plain in West China. In 311 B. C., in the Chow dynasty, Chengtu was first surrounded by a wall. Han dynasty engineers, at least 200 years B. C., first constructed the irrigation and river-control works for the benefit of the plain. They are reconstructed nearly every year by community co-operation.

In about 221 A. D., as the great house of Han was going to pieces, the Empire was divided into three parts, one of which chose Chengtu for its capital, and established there the Minor Han dynasty which lasted 42 or 43 years. Thus the city has important imperial traditions.

Three notable literati were connected with this city. Chu Ko Liang was the soldier-statesman and loyally supported his Han ruler. Tu Tzu Mei was a poet-patriot of the eighth century. He sang eloquently of Chu Ko Liang and of the distress of his country. Of nearly equal poetic power was Li Tai Po, a contemporaneous poet. These two are often considered China's master poets. The former has been favorably compared with Milton for his ruggedness of character, intensity of convictions, and for his power to manipulate and marshal words. These three give a literary color to the city even down to the present.

Chengtu was visited by Marco Polo in the thirteenth century, and he describes it as a "rich and noble city." It was famous then for its trade and general prosperity. Since his visits the records show that it has been frequently wasted and destroyed, but each time it rises from its ruins and proceeds. When Kublai Khan captured the city over 600 years ago, it is reported that a million people perished. Its walls have been partly destroyed and rebuilt several times, and the present defense is relatively recent.

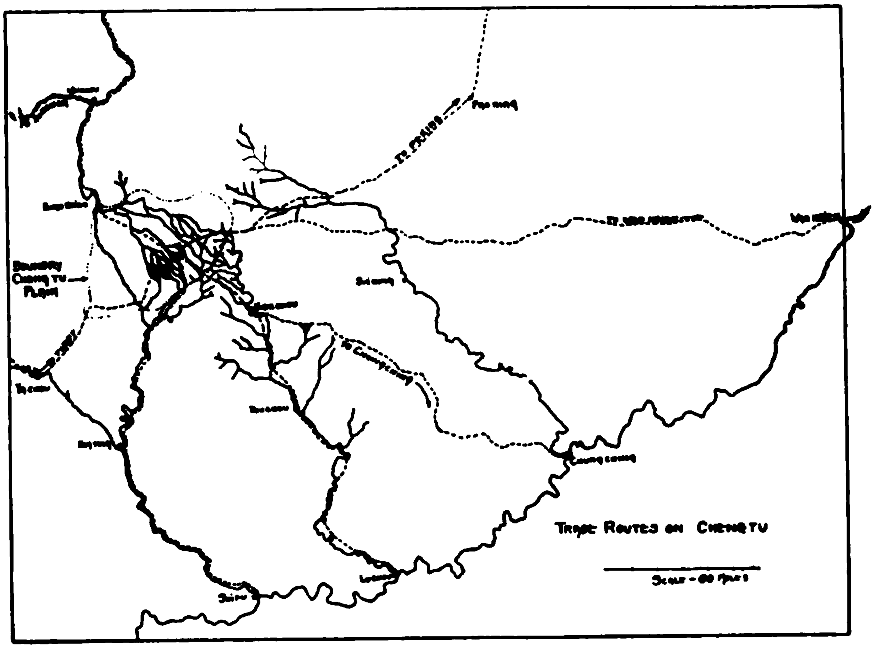
Today Chengtu is the capital city of the province of Szechuan. It has a Chinese population estimated at various figures from 600,000 to 1,000,000, beside which in the winter of 1920-21 there were about 300 foreigners. While it is not an open port, it enjoys some of the privileges of the cities so designated, and has consulates of the British, French, and Japanese governments within its borders.

Location

Chengtu Plain. Chengtu occupies the central part of the beautiful Chengtu Plain, an irregular tract approximately 40 by 50 miles, and containing between 2000 and 2500 square miles ~~(Map 1.)~~ (Fig. 4). This plain is practically surrounded by mountains. The mountains to the east, southeast, and south are simple fold structures that have been developed by stream erosion into advanced maturity. Those on the west and northwest are much more complex, involving folds, faults, and many intrusions, and at least two periods of uplift and erosion. The first cycle must have been carried to advanced maturity or old age; the second was initiated by a recent ~~(perhaps very late Tertiary)~~ uplift, and this cycle has not gone beyond the gorge stage on the main streams.

The plain owes its origin and development to the renewed activity of the streams after this recent deformative movement. Abundant waste has been carried out by the Min and other streams and laid as alluvial fans, now blended into one great compound fan over the foothills and foregrounds east of the recently elevated mountains.

The advanced mature mountains east of this plain are part of a series of approximately parallel folds trending north-northeast by south-southwest, and uplifted ages ago. Between these folds and between the western one and the rejuvenated mountains to the west of the plain are strips of nearly horizontal strata of the same age as those of the mountains. It is over the low, old hills, carved in these undisturbed strata east of the twice uplifted mountains, that the waste from the latter has been spread. In several places the tops of the old hills show through the plain. The plain descends gently southeastwards and over it the Min beneficently divides and subdivides as it makes its way to Kiating. The river, thus forming a network over the fan and augmented by several small streams that descend from the mountains north and west, loses a part of its waters to the Lu, but collects the rest together at the southern margin of the plain and proceeds to the Yangtze.



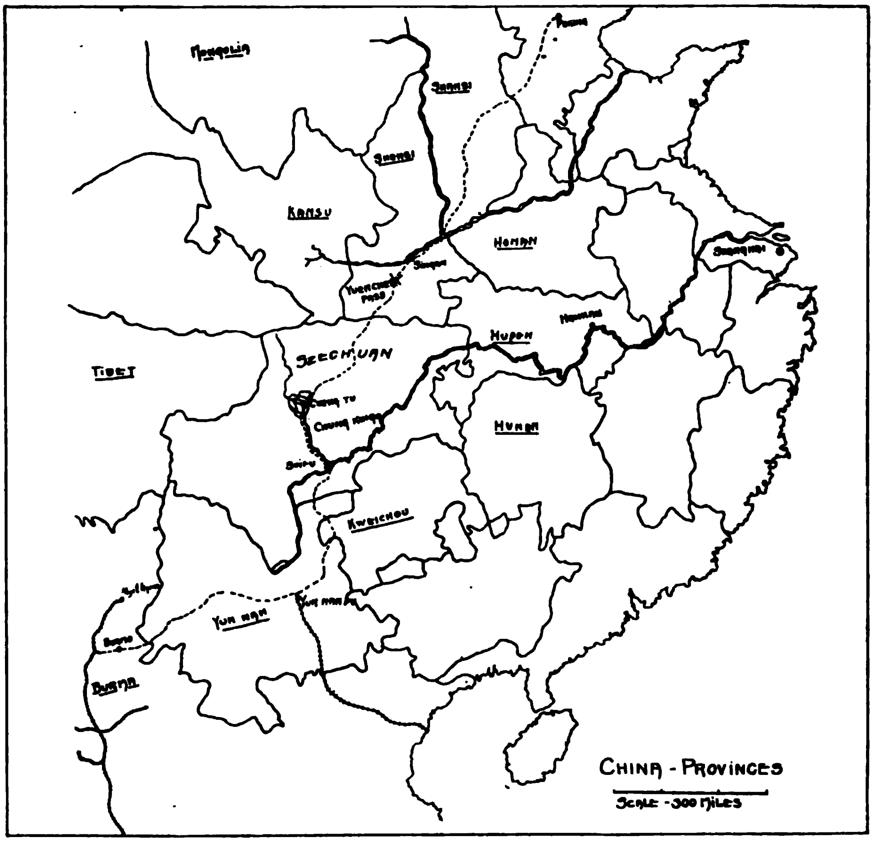
Map 1.—Eastern Szechuan, Leading trade routes serving Chengtu; also, in dots, the boundary of the Chengtu Plain with its network of irrigation ditches and streams

Routes Leading to and from Chengtu. In its beautiful setting, however, the city is far away from modern civilization. It is over 650 miles in a bee line from the nearest coast, 1000 miles from Shanghai, measured in the same way, and 1500 to 1600 miles the way one has to travel. It is 1000 miles from the railroad at Hankow, its most direct outlet; and some 360 miles from the French railroad at Yunnan Fu, but over rugged mountains and difficult travel by chair. Chengtu is also nearer the railroad in India at Myit Kyina than at Hankow, but the rough, mountainous intervening country, like the overland route to Yunnan, prevents much use of this possible outlet. (Fig. 46)

Several routes ~~(Map 1)~~ serving the city lead through the passes of the mountains or along the courses of streams, among which the most important are: (1) Down the Min past Kiating to the Yangtze at Sui Fu. (2) Up the Min beyond Kwan Hsien to Wei Chou, then northward into Kokonor or westward into Tibet. (3) Down the Lu or Chung past Kien to the Yangtze at Lu Chou. (4) Westward into the Tibetan mountains and plateaus past Ta Chien Lu, and then across rivers and intervening mountain ribs to Li Fang, Ba Tang, and L'hasa, a very important though quite difficult trade route. This road has the greater part of Tibetan travel and trade. (5) An overland route for carriers and chair passengers southeast to Tze Chow and then to the great river either at Chungking or Wan Hsien. (6) Overland by the Yünchan Pass. This route starts northeastward, crosses the plain for a day or more, then traverses old mountains, and at a distance of 80 miles from Chengtu, enters the series of high, difficult, often dangerous reaches that cross divides and skirt precipices, and finally, after many miles of hard travel, brings the merchant and his goods out at Sian (Singan) in south Shensi, an ancient Chinese capital. From this point the route is easy down the Hwei Ho to the Hoang Ho and then over the plains of east China to ~~Peking.~~

Chengtu and the Gorges. Down the rivers Min or Lu, then down the Yangtze some 700 miles, one comes to the world-famous gorges of the latter, upon which routes 1, 3 and 5, sketched above, converge. These gorges have been carved by the great river through the simply folded mountains of eastern Szechuan and western Hupeh. The mountains were first elevated long ago and nearly base-leveled at the same time the old hills below Ichang and the mature topography of central Szechuan were made. Then, in recent geologic time ~~(probably late Tertiary)~~, they were again elevated so slowly that the river could keep pace, and so high that the river could carve through them the stupendous gorges a mile deep. Each gorge is cut through a massive limestone layer 3000-4000 feet thick. There are two on each limb of the anticline crossed by the river, hence the river has several separate gorges. ~~(Frontispiece.)~~ In earlier stages of this carving, in prehistoric time, formidable rapids and possibly waterfalls occurred which would, if present now, forbid commercial connections between Chengtu and the down-river world; but today the stream has proceeded far enough in its present cycle so that with care the river can be navigated. While the cutting down and grading of the water highway is a slow process, it is continuous, and the worst obstructions are now removed. Every century this route will be a little safer and open more of the year to large boats. No other easy route has yet been made, connecting the outside world with Chengtu and its plain. The mountains of the chain through which the gorges have been cut ~~are generally rugged, and~~ lie continuously across the eastern side of Szechuan. If one would follow valleys from the plain out northward, other mountains must be crossed to get into the valley of the Hoang Ho. If the route south from Szechuan be attempted, it is found to lead up tributaries of the Yangtze and over divides among high rugged mountains, then down streams to the south China seas. Some day railroads will be constructed, leading from Chengtu to the sea in several directions. One of these has been surveyed along the Yangtze; one has been proposed northeast from the Yünchan Pass, and another south and west to Yunnan and India. But today, although the gorge route is less passable than could be desired, it is by far the easiest way out. To the presence of this one master river, rather than of a number of lesser ones in this part of Asia, a river which was able to keep pace with the rising mountain folds and maintain its course in spite of the uplift of mountains athwart its route—to the presence of such a river as this—Chengtu owes its main highway out to the sea and to the great world.

Chengtu and Its Neighbors. No clear understanding of the geography of Chengtu can be had without a glance, at least, at its political situation. The city is the capital of Szechuan, the great middle province along the western border of China. ~~(Map 2.)~~ This province adjoins Tibet with its riches, seclusion, and decay. It also touches Yunnan in a long, crooked boundary line, Yunnan with its mountains, minerals, and belligerent men. Toward the southeast it borders on Kweichow, a province much like Yunnan; and on the east, it touches two important central provinces of China, Hunan, and Hupeh. On the north Shensi, Kansu, and Tibet lie against it. All these provinces are important. Each is linked to Chengtu in some way. All but the two central provinces send much produce to this thriving capital, metropolis, and commercial center. These two send sparingly, but receive and use herbs, skins, salt, and oils.



Map. 2.—The provinces of China; the great river route out to Shanghai and the ocean; trade route to India and the railroad there

Out of the situation described under the last four topics spring a number of facts and relations which contribute to the city's importance and prosperity: (1) A great, rich agricultural plain, level enough for easy travel in all directions and large enough to feed multitudes of people; (2) Mountain lands nearby, rich in mineral resources, building materials, water power, and forest possibilities; (3) A splendid supply of mountain water, both for domestic uses and for irrigation and transportation; (4) Commercial connections leading back into Tibetan fastnesses with their varied wealth, and forward by river or overland many miles out to other provinces and to the sea with its world markets.

Resources

Soils. Chengtu has in her unique soils an abundant and perpetual resource. All about the city for miles in every direction spreads the great Chengtu plain. Its materials have accumulated through thousands of years to a depth of many feet, usually hundreds at least. These materials are clays, sands, and gravels brought down by streams from the mountains north and west. An extensive variety of rock in these mountains, both sedimentary and igneous, insures as great a variety as possible in decay products. There are the clays from shales and limestones, and from feldspars of granite and syenite. There are sands from sandstones and the quartz of granites; phosphorus from the phosphate minerals of limestones, granites, and metamorphic rocks, gneisses and schists; potassium from the orthoclase of granites; and in lesser quantities, in fragments or in solution, every element from the rocks that plants can use. Because of the manner in which the water is used by the agriculturists, most of this material, whether in suspension or solution, is conserved and made a part of the plain.

At present, because of the rapid destruction of the mountains, they furnish not only decayed rock, but ground rock from landslides, rock falls, and the continuous grinding and pulverizing work of the streams; and this renews the soils. The farmers have in many places built little stone wing dams or projections along the banks out into the water, behind which the streams in a back eddy deposit silt and sand. This is frequently rich, too, in organic matter. All these mud accumulations are carefully dug out and carried in baskets to the fields. The water when muddy is also led into basins and rice paddies and allowed to clarify, and thus a thin layer of valuable new material is added to the soil. In this particular stage of the topographic development of the region, nature greatly favors agriculture, through the perpetual and rapid renewal of the soil, with every needed ingredient.

(Cw).

• *Climate.* Chengtu is in north latitude about 30° 30′, and her altitude is only 1600 feet; so her climate is mild. Winters rarely bring freezing weather and usually only a few frosts. For this reason beans, rape, wheat, turnips, cabbage, spinach, peas, onions, leeks, garlic, and many other vegetables grow out of doors all winter. Rainfall is not abundant, but never too scant to permit growth, and usually ample for most crops in the fall and spring. These conditions permit the growth of two farm crops every year on most of the land throughout the plain.

Water. But this flower garden is still further favored in being watered by streams arising in the mountains where the rainfall is larger even than on the plains, and where the copious snows of winter melt in summer and bring the streams to flood stage in the heated summer when the rainfall is least. Since the days of the efficient and far-seeing engineers of Chengtu, Li Ping and his son, who, over 200 years B. C., initiated the beneficent irrigation works at Kwan Hsien, forty miles northwest of Chengtu, these mountain streams have never become a flood menace to the plain, but a source of steady water supply during the season of slight rainfall. These engineers divided the main stream, the Min Ho or Clear River, as it flows out upon the plain, into two distributaries, and each of these into two. A mile or two farther, each of the four streams is again made to bifurcate. Multitudes of lesser channels lead the water out over the lands, along ditches, beside the highways, through rice paddies, and amongst garden tracts; and so the life-promoting waters are had in abundance all over the plain throughout the warm summer season. ~~(Map 1.)~~ Irrigation ditches are located high on the plain, while drainage ditches are 10 to 20 feet lower, and much water leaches through the soil from the upper to the lower system. By this arrangement irrigation is a normal development and a close adjustment to geographic conditions; moreover because of the considerable rainfall, salts and fine muds that often clog irrigated soils never trouble the Chengtu plain. Further the streams are always clear and beautiful except in very rainy seasons.

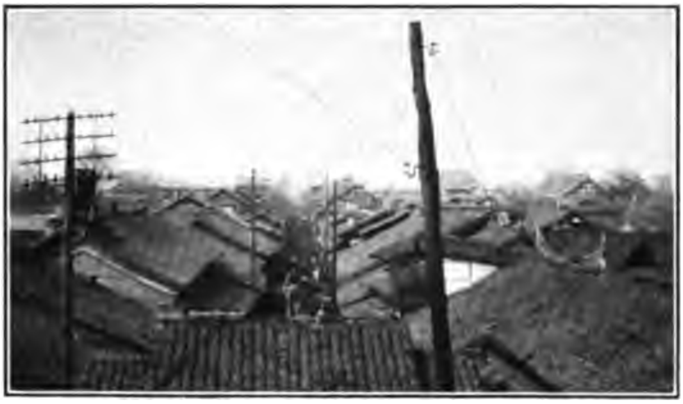


Fig. 2.—From wall at East Gate, looking down East Great Street, narrow but thronged all day. Roofs in Chengtu nearly cover the ground. Telephone, telegraph, and electric light wires help to enmesh the city

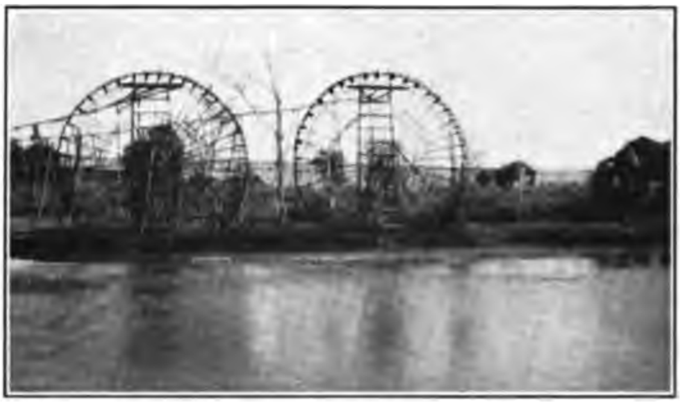


Fig. 3.—Chengtu city waterworks. Two lofty bamboo wheels turned by the current lift forty buckets of water at every turn and empty them into the horizontal trough near the top

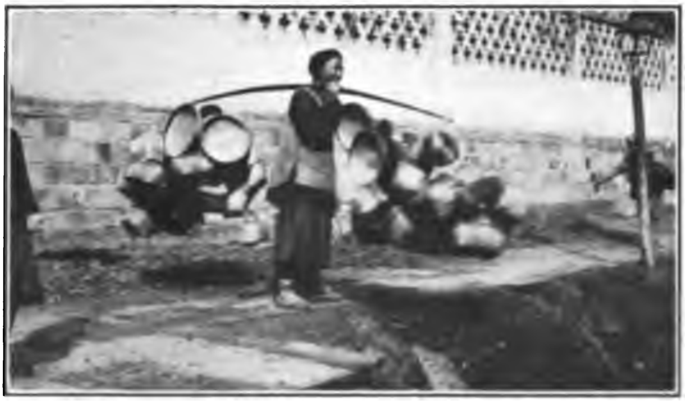


Fig. 4.—The basket merchant strolls along the narrow slab-stone street

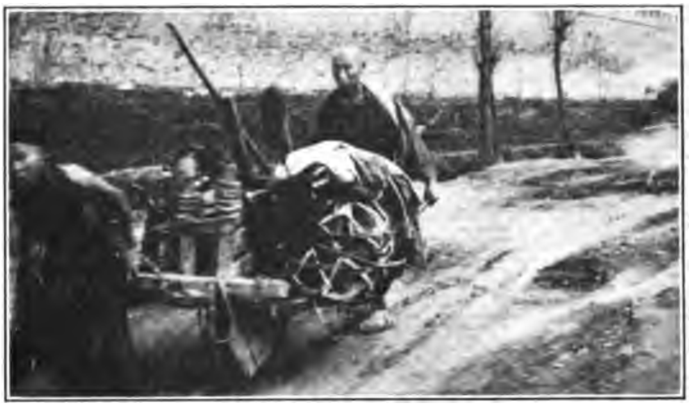


FIG. 5.—Coke on a barrow, small boy to pull

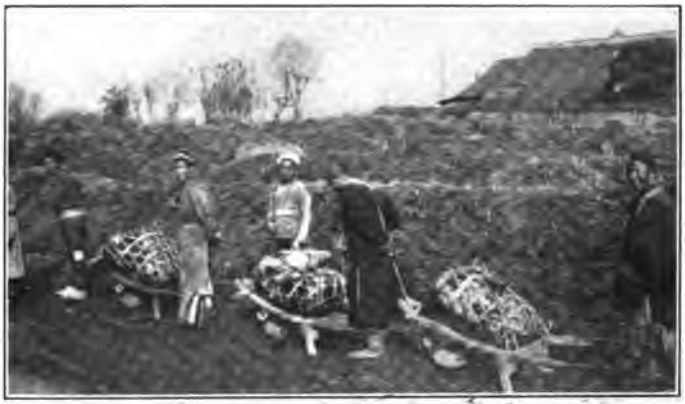


FIG. 6.—Three wheelbarrows of salt in bamboo slat bags. A puller and a pusher for each barrow. Graves beyond the road

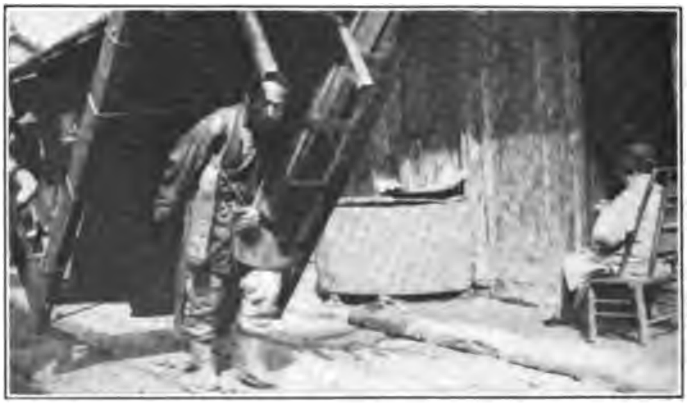


FIG. 7.—A city moving-van; furniture carrier. A large and a small table and several other pieces roped together

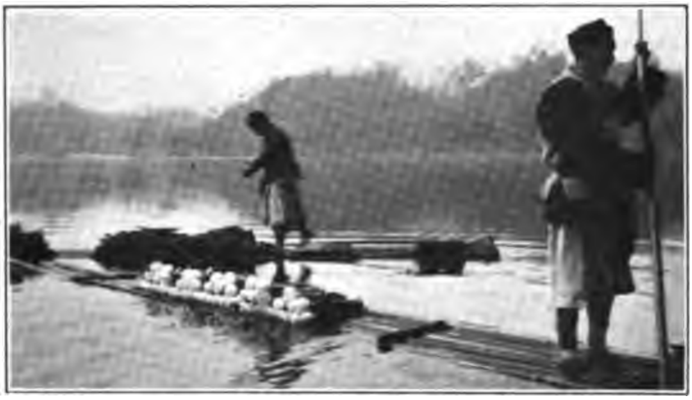


FIG. 8.—Huckster on a raft of six or eight bamboo poles, with his load of radishes or carrots for the market

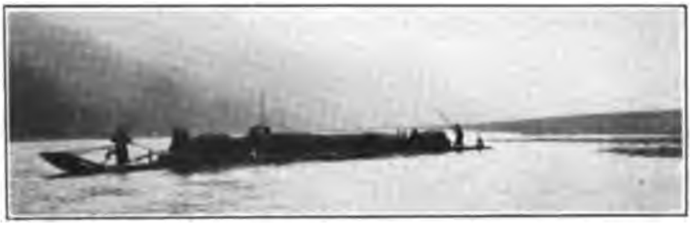


FIG. 9.—A 100-foot bamboo raft, four or five feet wide, transporting baskets of spaghetti and bags of goods propped up on legs Raft handled entirely by poles

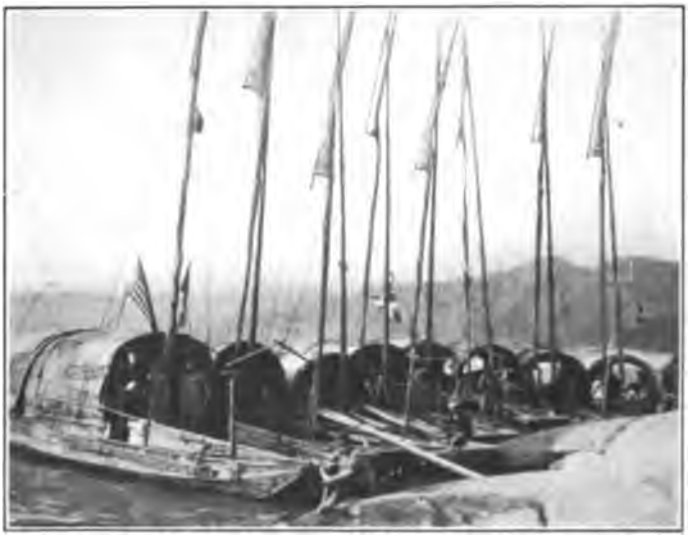


FIG. 10.—Freight and house-boats on the Yangtze, carrying freight and passengers to Chengtu. Single mast. The slanting pole is really the sail rolled up on lower cross arm and turned into a vertical position. Oars and bamboo cables for pulling boats to be seen in front

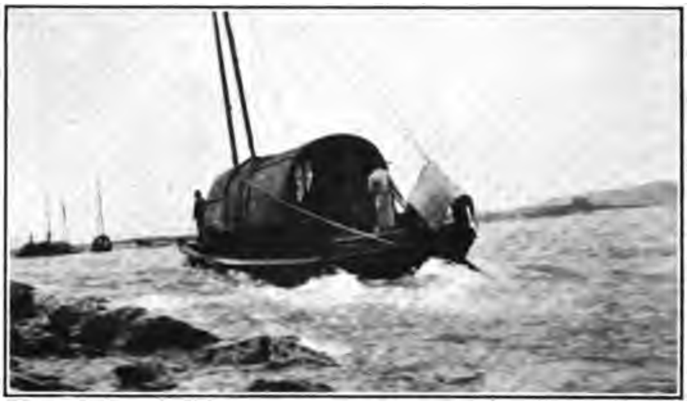


Fig. 11.—Near view of house-boat in rapids. The all-important bamboo pole hangs on the side. Below the deck, boxes, bags, and bales of goods for Chengtu; above, under the matting roof, are sleeping cots and dining-room for passengers

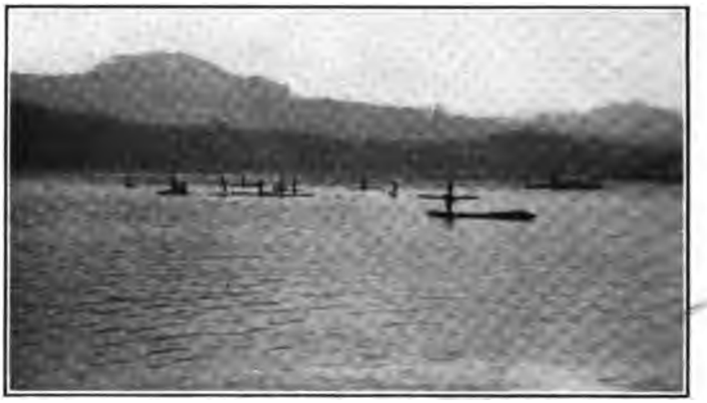


Fig. 12.—Cormorant fishing in the clear waters of the Ming Ho. Boats are made of bamboo poles lashed together

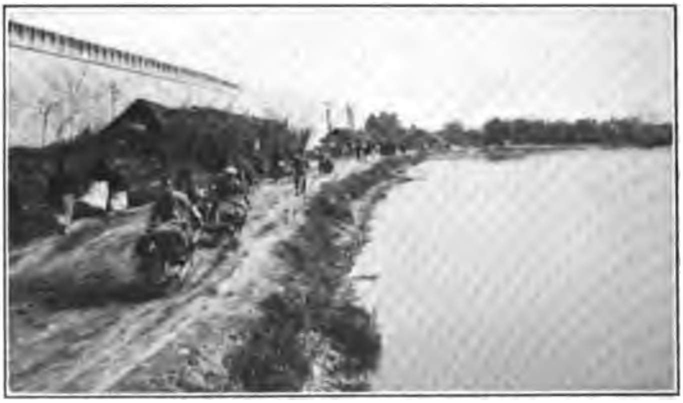


Fig. 13.—Salt, passengers, and foot travellers along great highway beside south wall, Chengtu

Land Crops. This copious water supply makes possible intensive agriculture, and man has succeeded in growing three to five crops a year on much of his land. The farmer often gets the second crop started while the first is ripening or being harvested. In this way, the plain is prolific indeed, and is competent to support a large population beside those engaged directly in agriculture. This is one reason why so large an industrial and commercial population can live in Chengtu. Food is never wanting. Beside food plants, fibers of cotton, hemp, grass, and bamboo are always abundant for clothing, bedding, rope, matting, floor covering, baskets, roofs, and fabrics for the wrapping of parcels. Two of the most noteworthy vegetable products are peanut and bean oil produced on the farms. They are expressed in big hand presses, from their respective vegetables. Rape seed also is ground and pressed to get the colza oil of commerce, which is extensively used in and about Chengtu.

Animals. The live stock industry in a region of such intensive agriculture does not extend to the large eaters like horses and cattle, save those needed for heavy work. And even for such work as plowing and marketing of crops, the beasts are not the only power. Men are the common carriers and occasionally, instead of the plodding water buffalo, three or four of them pull the plow.

But animal husbandry is concerned with the quick-growing food stock, the species that are easily cared for and do not require special food. Thus the hog finds a large place. A tiny pen sometimes prevents his roaming too far, but usually no restrictions are imposed. He lives in the street and in the homes with the children, chickens, and ducks. Everybody raises a few chickens. Ducks flourish in the canals, rice paddies, and ponds of stored water. Literally millions of chickens, ducks, and eggs are produced and consumed every year in and around Chengtu. Eggs are hatched in January and February, and the chicks and ducks can go alone in March, and are ready to broil, stew, or mince in April and May, when our spring chickens are pipping the eggs.

Aquiculture. The abundance of water-covered paddies for rice, standing without crops three to four months in the winter and spring, together with the many irrigation ditches, make it possible to have parapatetic poultry establishments. Back in the hills a hundred miles or so from the city, scores of farmers in a community raise a few ducks each. When the ducks are a few weeks old, a duck driver buys up a thousand, more or less, and starts toward the city. He drives them slowly along the ditches, among the flooded paddies, or over the narrow stone-paved paths. They cover but a mile or so a day for many days, but feed on the aquatic life in the waters. At night they are sheltered in a small, flat boat which the driver furnishes. In three or four months the flock arrives in Chengtu fat for market at no one's expense.

The thousands of acres of water in pond and paddy in many ways encourage specialized aquiculture. These water farms are fished over frequently with various kinds of nets, for fish, frogs, and snails; and some are dug over annually for roots of aquatic plants such as lotus, water-chestnut, and calladium.

The clear streams abound in life of many kinds. Fish in great variety and quantity are taken from them. Cormorant fishing is practiced on them, because the fish can so easily be seen as they hurry upstream to spawn. ~~(Fig. 12.)~~ Cormorants are tethered on long slender bamboo rafts at frequent intervals across a stream with two or three men to watch them. The cormorant watches the water for fish, and jumps in and catches every one he sees. His master quickly removes the game from the bird's pouch just above the ring or cord placed around his neck to prevent him from swallowing his catch.

Thus, with its flourishing crops, quick-growing livestock, including abundant poultry, and well-stocked streams, the Chengtu plain has food resources ample in all lines for a large agricultural population, and abundance to spare for manufacturer, carrier, and merchant.

Mineral Resources. But the resources are not limited to these lines. The mineral wealth of the plain and the surrounding hills and mountains still further attests the liberal hand that has provided for this city and state.

In the plain are clays and sands for brick and roof tile, both of which are manufactured in great quantities. The hills of the ancient ~~old topography~~ which have been almost, if not quite, covered by the upbuilding of the plain furnish deep residual deposits of clays, variously colored by iron. These are molded and burned into brick. Beautiful colors of red, pink, salmon, and browns could be made, but the burning process always closes with the douse of water on the hot brick which causes them to finish blue instead of red. The Chinese greatly prefer blue to red brick and tile. Many adobe or unburned, but sun-dried, brick too are used. The ~~dry~~ warm summer climate is favorable to their manufacture, and buildings of them resist the moderate and gentle rainfalls of the region very satisfactorily. Lack of freezing weather again adds to the "life" of a sun-dried brick house or wall.

In the mountains down the Min towards Kiating, sixty or eighty miles, and to a less extent in the residual hills of horizontal rock which here and there still protrude through the accumulating plains, a fair red sandstone is quarried. Thirty to fifty miles to the north a similar but much more firmly cemented red to purple sandstone is also found, while near Kwan Hsien more sandstone, granites, and porphyries abound. Most of these are worked and come by water to the building trades of the city.

Limestone is plentiful both north and west of the plain and is quarried for buildings and pavements. It is burned also and carried in considerable quantities to the city for lime, and to the farms for land dressings. No cement is made, although the raw materials for it are to be found within easy reach.

In the mountains fifty miles above Kwan Hsien is a deposit of partly silicified marble, which is called jade by the trade, and which is brought to the city in quantities for manufacture into ornaments, finger and wrist rings, cups, hair stays, earrings, and many other shapes. This rock is beautiful, white and green mottled, and occurs in quantities. It would make an exquisite ornamental stone of very durable qualities for floors, wainscoting, table tops, baseboards, and many other uses. Its tints of green are very attractive and its hardness and resistance to scratching place it in a class far above the ordinary marbles. White, yellow, and gray mottled marbles occur 100 miles up the Min near Wei Chow in great abundance, and in positions to be easily worked, but so far no quarries have been opened in them.

Coal is brought to the city both from the northeast, east, and south, and above Kwan Hsien several mines in five different seams produce much coal, quantities of which are coked and shipped by water to the city forty or fifty miles away. Oil and gas are not developed in the vicinity, but oil is known in seepages in several places within easy commercial range of Chengtu. Their place is taken at present by wood and charcoal found in the mountains north and west of the city.

Some sixty miles north of Chengtu are extensive copper deposits. These are well up in the mountains where slopes are very steep and valleys narrow. The mining is carried on by native methods, and smelting by more technical processes at Pei Shui Ho (White Water), a town about forty miles from the city. The metal is carried into Chengtu and enters largely into the coinage of the province. It is also made into wire, and with zinc, into bronze and brass for many purposes. Iron ore is not mined near, and iron comes to the city only in ingots and bars, to be manufactured into garden, farm, and shop tools, nails, bars, hinges, wire, and scores of other things.

For her gold, silver, lead, zinc, tin, and mercury, Chengtu has to send farther away. South of Ya Chow in the Mu Pin district, and many miles farther south, near Hwei Lee and Yüng Yuen, ores of these metals are found, a part of which find their way to the city.

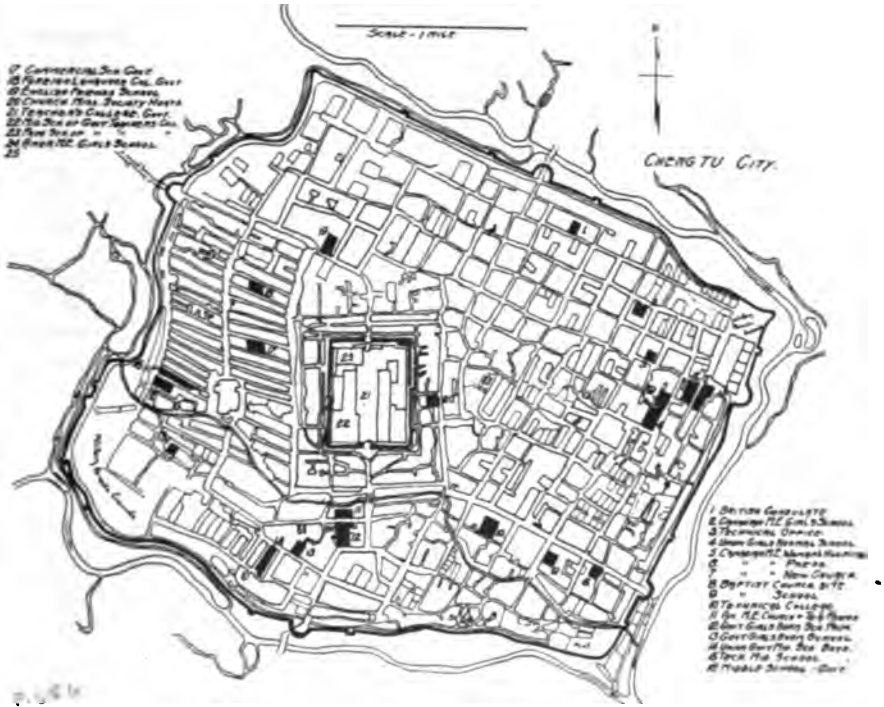
The City of Chengtu

~~*Area and Defenses*~~. Chengtu covers about twelve square miles, laid out in an area approximately rectangular, three by four miles. The city proper is surrounded by a wall mostly of stone, but partly of large brick, outside whose four gates have grown up large suburbs. ~~(Map 3.)~~ This wall, like most city walls in China, is no trifling affair, but represents a prodigious amount of labor and contains an immense amount of materials. Beginning on the outside, one finds a stone wall four to eight feet thick at the base and about two feet thick at the top, thirty to forty feet high and set with columns, notches, and parapets all round. Through the columns are firing holes and peep holes. Forty feet or more inside this masonry is a second wall, not quite continuous, because allowed to fall down in places. This too is of stone and brick, but the brick here greatly predominate. This inner wall is about six feet shorter than the outer and is smooth on top. Between the walls, earth has been filled in until level with the inner wall, which really leans against the dirt. Over the top of the earth is a pavement of flat stones and large brick, covering all from wall to wall. Thus in cross-section, the wall is a great earth structure raised on the ground, retained on both sides and covered on top with stone and

Fig 11

brick, the outer wall above the pavement on top being a series of parapets and slits with holes through which to use guns and watch the enemy.

At frequent intervals along the wall, broad outside abutments have been built which serve to let the defenders of the city get a side shot at anyone trying to scale the wall. No approach to the top is found on the outside, but inside stairways are frequent, and steep driveways are found at each gate where horses or men could pull up cannon and loads of ammunition. The earth used to fill in the wall is taken from outside, and its removal helps make a wide, deep moat around the city, which when filled with water adds to the difficulties and exposure to fire imposed upon the enemy who would reach the city. ~~(Map 3.)~~ In times of peace the moat is used for water transportation. In more prolonged peace



Map 3.—Plan of city of Chengtu. Heavy line surrounding is the wall. A moat or stream completely encompasses wall. Legend above locates many important centers. Each block is a mass of little buildings

or in neglect, the water is allowed to escape and the floor of the moat makes rich productive gardens.

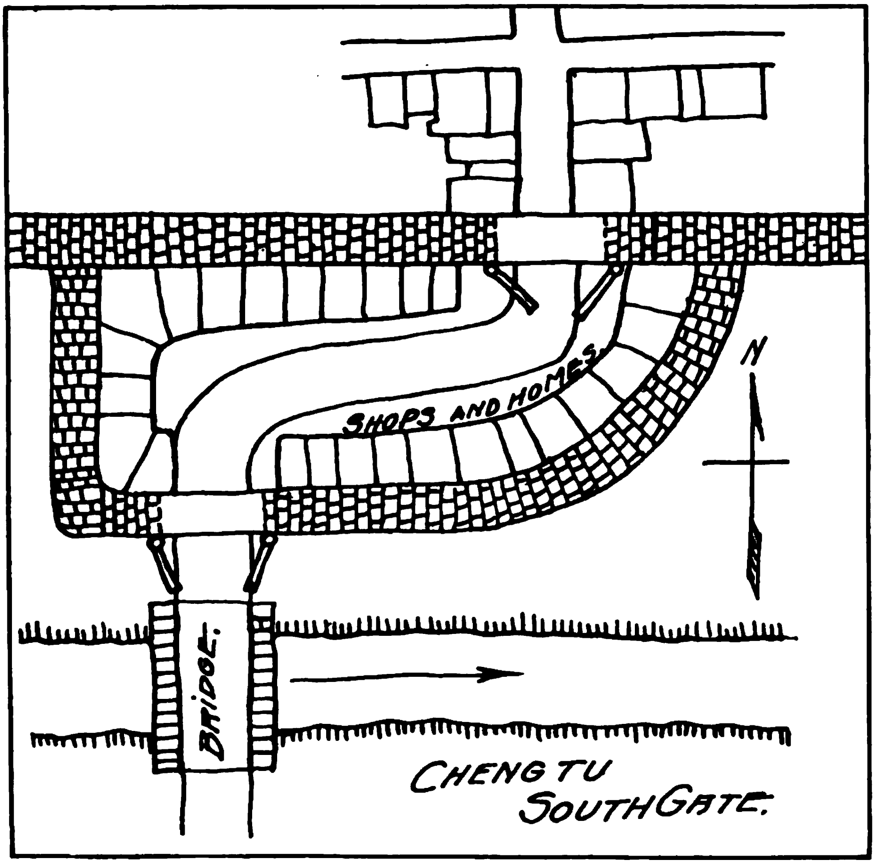
In the wall on each side of the city is a huge gateway, sometimes closed by doors in two places, a pair of swinging doors closed every night, and an iron-plated plank door, or set of bars, that in times of special danger slips into grooves in the archway through the wall. Outside this gate of the wall proper is built another wall, like the rest, and enclosing a considerable court. Through this outer wall, but not opposite the wall gate proper, is another archway and gate. Soldiers, shopkeepers, and sometimes a den of thieves occupy in perfect peace and harmony this between-gate court. ~~(Map 4.)~~

The south gate is nearly in the center of the south side, and the north gate is nearly opposite. The Great East gate is not far from the southeast corner, and the Great West gate is near the northwest corner; but no street goes directly across from one gate to another. The street leading straight in from each gate loses itself in alleys before it gets across, so as to prevent the evil spirits from going through the city.

Pl. 16 The gate arches are surmounted by gate towers which are occupied by soldiers, munitions, guns, and barracks, and from which the gateway and the roads leading to it can be defended. At intervals too, along the top of the wall are stone or brick shelters for patrolmen; and at two or three places lesser walls have been built across the top of the city wall. These barriers have gates which are guarded and often closed so one cannot go entirely around the city on the wall.

Since the wall is higher than almost any building inside, it provides a splendid place to walk to see the city or to get clear air and sunshine or cool breezes, as the season suggests. The bell or drum tower at the prominent street intersection in the city, two or three tall pawn shops, the mission church steeples, and the hospital building of the Woman's Society of the Canadian Methodists are about the only structures one cannot see over when walking on the wall. A sea of low roofs, well below the eye, covers almost every foot of ground.

Imperial City. In the central part of the city, occupying less than one square mile, and situated nearly equidistant from each wall, but standing square with the cardinal points, is the old Imperial section, walled in severely from the rest of the city. In it are temples and old palaces in ruins, and the site of the old examination halls. But today the temples are not visited, the Manchus have perforce deserted the palaces, and the old examination halls have been razed. Palaces and examination halls no longer function in China's political and educational systems.



MAP 4.—Chengtu South Gate plan. See stream, outer gates, court, inner gates, street, and a few houses within. Gates are set in an archway through the wall

Part of this inner city is now used for the home of the Government Teachers' College, with its preparatory and practice schools. Some of the old buildings are thus occupied, some have fallen down, others stand deserted and neglected. The front or southern part of this once imperial city also houses a division of the soldiery with their horses and harness, so that it looks quite like a large livery stable of the country village sort. But over its great gate in Chinese characters one still can read "For the State, Seek Wise Men."

Streets and Shops. Streets are rarely wide enough for an auto to pass through, even carefully driven at a slow rate. Such a width, too, when present, continues only a short distance to some gate or arch or jutting building. There never are yards in front of the houses, rarely any behind. Houses abut on the street, but their alignment is quite imperfect. Offsets of one to three feet are common. Awnings, mattings, shelters of boughs, big signs, and banners often completely shade the narrow street.

l.89 — Most of the streets of the city are paved with flat stones three or four inches thick and about one by three feet in area, laid side by side. In some streets the whole width is covered. In a few, only one row of stones, end to end, helps to keep the pedestrian out of the mud. In such streets the waste water and run-off from rains, flow in open ditches along the sides of the streets. Where the pavement covers all, these ditches too are out of sight, but none the less present and filthy. In all the large streets one row of stones in the middle of the pavement is laid a little higher than the rest, and with a little more care, A groove has been worn lengthwise in it by the many wheelbarrows which use it as a roadway. The rest of the pavement is so uneven that wheeling is difficult, and even walking troublesome. The street sweeper is not well developed. Each man or woman before his own door with a small hand broom of brush gathers the trash together, as he pleases, until someone who wants street sweepings comes and removes the pile.

West of the Imperial City is a section called the Manchu city, more than a mile in extent each way, with streets laid out more regularly than in any other part of the whole city. Usually the streets are placed with some reference to the walls of the inner city or to the outer wall, making many irregular corners where connected with the main thoroughfares. The result is a network of major and minor streets which, if known, serve the populace very well, but which, if not known, prove quite confusing.

A few main streets should be mentioned. From the East Gate almost to the corner of the Imperial City leads the East Great Street, probably the broadest and perhaps the longest straight street in Chengtu ~~(Fig. 2.)~~ It is thronged from daylight to dark with carriers ambling along under their burdens. Merchants hurry to meet prospective buyers or sellers at their shops or in a tea room. And the peddler is always there, hawking his wares with an intonation, whistle, gong, or clapper, everywhere characteristic of his trade. Among these types jostle the housewives and others who have to buy for the home, and the scholar or soldier who has little else to do on the street but wander and chat. From the South Gate a similarly broad busy street leads directly into the city a half mile, then angles to the right, then to the left, and runs straight into the south entrance of the Imperial City. Shops with homes behind line these streets continuously on each side. And lesser streets branch away somewhat at right angles on either side. From the West Gate, too, a more crooked street leads inward more than a mile and then turns in a broad curve and swings through the arch and gate on the north side of the Royal enclosure. No such direct street can be traced in from the North Gate. The Arcade is a group of buildings, situated about a mile straight east of the central part of the old capital, and occupied by a variety of retail shops, much as in American cities. A covered street connects these various stores and shops.

While all the city even the busiest business streets, is a residential section, and no place is without its children, chickens, and pigs playing in the streets, yet in some parts, these last-named elements predominate. Side streets off the main streets, or connecting two main business thoroughfares will have few or no shops. Here homes alone fill the streets and come to the front. In every home something is manufactured for sale. Women wind cotton, yarn, thread, or silk; they embroider, weave, sew, make toys, incense sticks, flowers, or funeral money. Men make mats, tubs, buckets, baskets, or feather dusters, weave cloth, mats, or embroider scrolls or banners, shape iron, brass, or silver tools or trinkets, or work with the women on the projects they have in hand. Children down to six or eight years old often help at something—reeling yarn, sorting feathers, smoothing wood, mixing or grinding incense powder, or any other little thing their unskilled hands can do. The products of these home activities are shouldered by some member of the family and peddled, or are taken out to a store on a more frequented street.

Men with stacks of bolts of pretty cotton goods, blues in all tints and shades, checks and stripes, and a few other colors, or bales of towels piled up three or four feet high on their shoulders and stayed with a cord from the top held in one hand, stalk the streets all day. These drygoods stores sometimes have a piece of canvas or oiled sheeting over to prevent damage, but in good weather no cover of any kind conceals their wares.

Scores, even hundreds, of people make their living feeding the great traveling public. Inns and eating counters, tea rooms, and tramping food-venders are common institutions. The portable kitchen has a stove and a sales table on opposite ends of a shoulder pole. Under the table are drawers and compartments of the various necessary supplies for the cook-carrier-salesman. Above and around the stove are the kitchen utensils and other supplies. He makes several kinds of eatables, cakes for example, or sweets, or meats, and offers them for sale. The would-be diner buys meat of one, crullers of another, sweets of another, and so on until he has his fill.

Sections of various business streets are devoted to special types of industry and commodity. Here are two or three blocks in which every shop is loaded with water pipes for smoking tobacco; there are a few blocks where only artificial flowers are sold; again a section devoted to the cutting, polishing, and sale of jade; then perhaps will come the shoe street, bamboo street, or the shops selling the little black skull caps so many people wear. In a section near the South Gate feathers are dried, sorted, cleaned, made into dusters and other articles, or packed for shipment. Along the east wall is a row of tiny shops where millions of incense sticks are prepared for sale. The wooden part may be made elsewhere and the powder in a second place, but here they are put together, dried on the wall in the sunshine and breeze, and tied in bundles for the superstitious worshipers to buy. On the west side are two or three streets that click and hum with the weaving industry. Bolts of cotton cloth come out of one part and thousands of towels from another. Still another street near by dyes the cloth blue in great indigo vats. North of the incense section and along the east wall is the row of squalid huts where the hog bristles are cared for.

Baskets and baskets of them come in here. After washing they too go upon the wall and dry in the sunshine; then they are sorted, baled, and wrapped for a long journey. The Chinese have little use for them, but they send them in boats down the small rivers to the Yangtze, then by steamer to Shanghai where they go to sea to be used for brushes in America and in Europe.

There is probably not a single establishment in this whole city that is large enough or has division of labor enough or uses power machines enough to be called a factory, unless it be the mint in the southeast corner. Here copper from old coins and from the mines north of the city, and brass from old wares are melted up and cast into new coins by somewhat modern, western methods. A few miles south of the city is the arsenal, a rather extensive plant constructed some years ago by a German for the Chinese. Here many kinds of military supplies are made in real factory style. The whole group of buildings and grounds is a model of neatness and exactness, such as no Chinese structures anywhere about could possibly suggest.

Waterworks. The city waterworks constitute an ideal of cheap efficiency. Outside of the south wall a distributary of the Min flows the whole length of the city. Because of its source and its course in quiet ways over the plains, its waters are clear and remarkably clean. Two great wheels of bamboo have been made and mounted in the edge of this stream. ~~(Fig. 3.)~~ They look something like the famous Ferris wheel, but are not quite so large. Each is equipped with dozens of big bamboo tubes set obliquely across the rim of the wheel in such position that they fill with water when down under the surface of the stream. Then they come up open end first, so they do not spill until they reach the top. Here as they are carried along, they are canted over and pour their water carefully into a long trough placed beside the wheel and as high as possible. Four or five of these buckets are pouring out their contents at any given time as the wheel turns. They become empty by the time they get beyond the trough, and then are carried down to be filled again. The wheel also has flat boards at frequent intervals on its circumference, against which the current of the stream at the bottom pushes sufficiently to turn the wheel. Thus thousands of gallons of water are lifted daily and poured into the trough at the top, whence it runs in bamboo pipes to large stone tanks in various parts of the city. The citizens themselves, or men who get pay for carrying, come with two buckets on a shoulder pole and dip from the tank and carry to the homes. The power is as perpetual as the mountain stream. The original cost is very small, and the upkeep per annum is less, for it only includes occasional repairs on the bamboo conduits and on the squeaky, rickety wheels. Probably the axles are not oiled more than once a year. The wheels do not supply all the needs of the city, but are supplemented by many wells. Since the plain on which the city is built is higher on the north side of the city, the water thus provided does not serve the extreme northwestern wards. Were the wheels erected on the upper side of town, the system would be well-nigh perfect in its efficiency, cheapness, and geographic adjustments.

Sewage Disposal. Chengtu has developed a sewage system quite in keeping with its surroundings. The great productiveness of the soil must be kept up. This requires the return of as much as possible of the fertilizing values removed in the crops. Animal excrement is carefully collected all over the city, and on the paths outside, by a scavenger class who go about with bamboo baskets and bamboo tongs picking up dung of all kinds. In the gardens and farms about the city for miles are walled-up tanks four to twelve feet across, often with shelters over them, set in the ground, four to eight feet deep. The gathered excrement is thrown into these for a consideration paid by the farmer, and here allowed to partially decay.

In the city the night soil and all waste from multitudes of public comfort stations is carefully collected and carried to tanks of this sort for a few days, where it is mixed and fermented, then taken to the farmers. For ages the open bucket on a carrying pole was the conveyance, but recent movements have been originated to cover the buckets, and finally to confine the waste in tanks while it is in the street. At present two cylindrical tanks holding a half-barrel or more each, are lashed to a wheelbarrow, one on each side of the wheel, filled and plugged, and then wheeled far out into the country to the purchasers. In the morning at all of the city gates processions of these barrows are seen going out into the country for six or eight miles.

In this way the city is kept fairly clean so far as such waste is concerned, but with much danger from diseases harbored in the waste; and the farms get the benefit of all there is to be had from this source. The system has its drawbacks even on the farms, for the liquid fertilizer is poured upon the ground under growing crops and on them as well, and no foreigner dare eat fresh vegetables without careful washing and boiling. Radishes, lettuce, green onions, and some other vegetables from the native gardens are thus essentially forbidden to the foreigner. Chengtu is not peculiar in its general plan of sewage disposal, but in no other city have the closed cylinders on wheelbarrows been seen.

Some chemical or sanitary engineer should devise a sewage system combining the virtues of both the Oriental and Western systems, eliminating the faults of both, and thus have an invention or process with a ready market in every city on three continents, or wherever intensive agriculture must be practiced.

City's Supplies. Here on the Chengtu plain is a city of 600,000 or more people, flourishing and growing, and yet it has no railroad within 700 miles to bring in food. It has no lake or sea near, that can serve as a ready-made transportation system. Its river is only a system of irrigation streams in and around the city. No steamboats or large sailing-vessels can come near. It has no auto or tram road, no wagon roads, no horses or even bullocks or donkeys bringing wagon- or cart-loads of produce.* Yet Chengtu is nourished, and it is famous both as an industrial and a commercial center. Food comes into the city in abundance. Famine never occurs here. Raw products arrive and are made up into finished products and sold in the vicinity or shipped out to distant markets. The produce of the whole district and for many miles north and west is gathered here and reshipped to the world's markets. How can it be done?

~~By Coolies.~~ The human carrier is the solution. While the backs of donkeys, cows and buffalos, and many boats help to move the goods, the coolie with his carrying pole or his barrow is the real means of transportation. Every market gardener comes to town

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*An ancient inscription and picture on a tile slab, preserved in a museum, shows two chariots with horses attached, and a driver standing in the box which runs very near the ground. There certainly are now no roads in the plains where such vehicles could be used. They may never have been used here, but simply record something a traveller to Assyria or elsewhere had the privilege of seeing.

laden with his spinach, cabbage, corn, beets, turnips, and carrots piled high on two baskets and slung on a shoulder pole. The poultry man as he comes to market brings chickens, ducks, pigeons, or geese in broad bamboo baskets, two on a pole, or lugs two great baskets of eggs. A pig is tied and hung by his legs beneath a pole and two men carry him in, or two pigs are lashed to a wheelbarrow like two bags of grain and trundled along in state. Sometimes a 694 drove of pigs or sheep goes to market "on the hoof." Outside the gates places are provided for sticking and dressing pigs, and a large slat shelter somewhat like a midwest corncrib with beams and hooks is filled with half pigs suspended over night to cool. These are carried in the morning, two halves on a man, into the city to the pork stalls or shops for the day's trade.

Rice, wheat, and other grains, dry beans, peas, and peanuts come in bags on clumsy, squeaky wheelbarrows with a muscular man between the handles, pushing and straining under his load, and a boy or another man in front with a tow rope of bamboo over his shoulder, pulling his best. The man behind always has a strap of cloth or leather over his shoulders, with its ends hooked to the ends of the barrow handles. This gives him more freedom with his hands and really a better chance to handle his burden when roads are slippery.

Stove wood and charcoal for house fuel come corded neatly in bamboo frames, two of which are slung on the shoulder pole. Some charcoal is in baskets, and wood comes, in many cases, on barrows. Great bales of brush, reeds, grass, and tree trimmings, two on a pole, come in also for fuel. Logs and poles and occasionally sawed lumber come on barrows. A dozen men with poles and bamboo ropes carry big squared timbers from the river to building sites where they are sawed by hand right on the grounds where they are to be used. Large trays of oranges, peaches, plums, pomelos, and other fruits in their seasons are carried on shoulders through the gates and down the streets to purchasers. Some men bring in great piles of empty baskets for sale. ~~(Fig. 4.)~~

Hides and leather, furs, skins, wool, hair, and bristles are transported into or out of the city in the same honored way on men's backs, in bundles whose size is suited to the weights of the substances. Coal, coke, salt ~~(Figs. 5, 6, 13),~~ pig iron, lime, building stone, sand, clays, and copper come in on barrows, sometimes for many miles, as do loads of tobacco from the tobacco district north of the city.

Many passengers come and go on wheelbarrows, but all personal effects are generally carried on poles. Even though a man is out for only a few days he takes his bedding and food, also means for cooking and serving meals, beside extra clothing. A whole squad of men may be needed to carry the luggage of a small family. When moving day arrives no great motor truck backs up to the door, but coolies with ropes and sticks come and tie up beds, tables, chairs, and benches into suitable loads, which they shoulder and then amble away. ~~(Fig. 7.)~~

P b 95 And so the narrow roads are crowded practically every day from daylight till dark with these patient, ambling, burden bearers. Usually the roads are provided with a row of flat stones for pavement, end to end on the second class or less-used roads, and side by side on the more used thoroughfares. Along the way every few miles, usually in little villages, are rest shelters, tea rooms, or lunch counters. Carriers stop at these a few moments and chat if inclined, sip a cup or two of Chinese tea (hot water poured over a pinch of tea leaves), or hurriedly eat a sweet or fried cake or a bowl of rice, then take up their freight and plod along. At night their stops are usually at the Chinese inns in the towns or cities.

A very large percentage of the people are carriers (20% to 30% of the men are common estimates), and yet China has not entered upon a real commercial stage. She cannot do so until cheaper transportation develops. Much too large a proportion of her population is now in the carrying business to develop a large industrial class, and thus to have much to carry and export.

Chinese Inns. This remarkable expansion of the coolie commerce provides an interesting sidelight on the Chinese inn. Chengtu, with most of the other towns, provides lodging and eating houses for the carriers. They must be cheap, else those for whom they are provided cannot afford to use them. No carrier has extra clothing or bedding. How could he carry such things and carry his 100 or 150 pounds of merchandise besides? When he comes to an inn, he takes a washing-down as any beast of burden would. Then with his same dirty, sweaty clothes on, he eats his plain, coarse supper of rice, vegetables, and bits of pork; then he smokes a pipe or two and "turns in." A whole squad of them sleep in a row on the floor with a little straw and some old *pukais,* or perhaps a half-dozen of them in as many board bunks in one small closed room. Working clothes may be partly removed, but not wholly. Practically every patron is a "beast of burden"; hence the Chinese inn is essentially a livery stable all through this region where the West has not penetrated and where man is the carrier. Chengtu is in the midst of this type of commerce. There are so few travellers of any other sort that no different provision is made for them, except that a Chinese gentleman or a foreigner, if alone, can have a room to himself. But he may rest assured that the room was used by carriers on previous nights if there were none of his class to take it.

Supplies Brought by Donkeys. Beside the human carriers, hundreds of laden cows and donkeys come in and go out of the city every day. They usually carry goods that are scheduled for long journeys. First-class mail, however, comes in on men's backs; second-class mail on donkey's backs. Trains of thirty to sixty donkeys are dispatched every day from Chungking with second class and parcel post mail for Chengtu and places enroute. Much of this mail is parcel post-stuff, and such as goes by express in America. Similar, though smaller, trains are made up at Chengtu and started out for river cities. They are added to along the way as other towns are passed.

Donkeys and cows are much used for carrying the grains, nuts, leather, coal, iron, bales of cotton yarn, raw cotton, and for wood, charcoal, and other heavy articles. These animals follow the same narrow paths and roads described for the coolie carriers. They are usually corralled in stone-walled courts near the villages at night. The saddles and goods are stacked in the center, the drivers sleep among the stuff, the animals are tethered around, and a dog and a man keep watch.

Transport by Water. Wherever possible the irrigation canals about the city and over the fan plain are also extensively used for commerce. Such a waterway runs along the whole north side of the city, and turns at the northeast corner and follows the whole east side. At the southeast corner it is joined by a similar but somewhat larger stream which has paralleled the south wall. A small stream, augmented by many little streams and gutters of surface drainage, gets itself together in the west central part of the city and worms its way eastward, south of the Imperial square under a score of arched bridges. It passes beneath the wall between the east gate and the adjacent city corner as a considerable canal which floats many boats. Hundreds of boats are poled along these streams from nearby villages, farms, and gardens, loaded with supplies for Chengtu. (Figs. 8, 9, 10, 11.) Most of the boats are unloaded near the gates, and their contents are carried in; but many boats full of coal, wood, charcoal, and blister copper go in under the wall to the mint in the southeast corner of the city.

The streams around the city are a part of the intricate network of canals and streams all over the plain. (Map 1.) Probably every village on the whole plain could load its boat at home and ship its goods to the city without trans-shipment, but in many cases, the route would be circuitous, too round-about to serve for anything but heavy, imperishable freight.

A small boat is much used on the rivers for freight and passenger service. Its body is long and wide but shallow. Freight is packed below the deck which is but a few inches from the water level when the boat is loaded, and no farther from the top of the boat. Above the deck rises a flimsy shelter of bamboo poles and mats which serves as a shelter for more light freight or for a few passengers. A mast carries a sail which is used whenever wind is available. A bamboo pole serves to push, pull or lift the boat along in close quarters. Oars, 4 to 10 are used on the fore deck in quiet water, and a bamboo cable with the men on shore is used to pull the boat over rapids (Fig. 11). All manner of devices have been applied to boat, sail, rudder and processes of sailing, to take advantage of every possible help that current, wind or reef might furnish. Granting that this type of boat is the best means of navigating the rivers, one must confess that the Chinese have adjusted to every geographic factor as closely as possible. But the first premise is wrong.

By these various means and from this whole environment is the city nourished. No railroad or seaman's strike, no fuel shortage or interstate entanglement could cut off the flow of supplies, for much of the latter is owned by the people who carry it, and the rest is carried by private contract. There is no common carrier except the carriers of the Chinese Post Office system, and they never carry general merchandise. Moreover, they are the least liable to interference of all carriers.

Education. Since Chengtu is the capital of the province, it is expected to maintain more of an educational system than other cities. The city contains numerous lower and higher primary schools, some open to both boys and girls, some for boys alone, and a very few for girls alone. Some of these are supported by national appropriations, some by state, and others by city taxes. In a province and city as rich as Szechuan and Chengtu, there should normally be no difficulty in providing education, but owing to political unrest, there is at present serious trouble.

Beside the lower schools, there are a dozen middle schools, corresponding in grade to our high school. None of these is co-educational. Some are aided by the national or provincial government; others are supported by the city; a few are private enterprises; and three or four are supported by residents of Chengtu who have come for commercial purposes from some other city or province, as for example, the Chekiang Middle School, and the Sui Fu and Tze Chow Middle Schools.

Normal schools, both for men and for women,—schools of about middle school grade,—train elementary teachers. Chengtu also has seven so-called colleges, all receiving government aid. Probably the best of these are the Teachers' College and the Technical College. In addition, there are the Foreign Language College, the Chinese Classics College, the Commercial, and the Law Colleges, and the College of Agriculture. All of these institutions do work of college grade, but all, with the possible exception of the Classics College, have much middle school work, and receive students with little more than higher primary training. In some instances their statistics of attendance are so confused that it is impossible to tell how many students are really of collegiate grade.

Missionary enterprise in Chengtu provides schools of all grades, from kindergarten and primary to the university; and the West China Union University is the only institution in the whole province which the government permits to grant degrees.

But when all this has been said for Chengtu education, provision has not yet been made for more than one-tenth of the boys and girls of school age. Provision for higher education is proportionally more liberal than for elementary. Further, because this city is the capital and a central city, men come to it for educational advantages from all over the province. Hence, the students in the schools do not represent the use Chengtu herself makes of her schools.

Temples and Churches. Chengtu is also well supplied with temples. Near the South Gate two beautiful shady temple enclosures are located within the city walls; as are two or three in the northern part of the city; and others in the southeast. Probably the more elaborate heathen temples, however, are outside the city walls. A very extensive Taoist temple monastery has been erected and for centuries maintained, a mile west of the southwest corner of the city. Here live scores of priests, who care for the temple and its parks and groves. North of the city, near the North Gate, a similar elaborate Buddhist temple has a retinue of servants, priests, and sub-priests in training. The people do not flock to these places as once they did. Ordinary patrons are not numerous enough to keep them up, and most of them would decline completely were it not for the occasional munificent gift of some wealthy man who has large sins for which to atone, who wishes great merit, or who simply dislikes to see the religion of his fathers decline.

The Christian church is taking its place among the people, both in organization, institutional work, and church edifices. The Catholics have a large hospital in the west part of the city, the Canadian Methodists another in the northeast, and the American Methodists a third in the south part. The latter mission has two well-equipped institutional plants with tea house, lecture halls, and other equipment. Other organizations doing intensive work are the Baptists, Friends, and Church Missionary Society. These missions, except the Catholics, are the founders and co-operating managers of the Union University. Three fine brick church buildings have been erected, and other missions hold church in adapted Chinese houses. Both the Y. M. C. A. and Y. W. C. A. have efficient organizations, and they are constantly lifting and tugging at the hundreds and thousands who deliberately walk into their influence. It is probably true that several of these mission institutions now actually reach more people than the heathen temple equipment, but it might still be doubted whether any one has as many adherents as have the Taoist or Buddhist temples.

Government. Like all Chinese Provincial capitals today, Chengtu has a double-headed political machine. A civil governor and a military governor work side by side with their numerous subordinates, sometimes at serious cross-purposes, sometimes in open strife, oftener with one side in quiet, intriguing submission to the

other. For several years in Chengtu, the military governor and his soldiery, often made up in part of robber bands, have dominated the situation. He and his party get most of the money and spend it as pleases the leader. The soldiery must be supported, whether the schools and the public works and justice departments get anything or not, a rather unfortunate condition for any city.

Population. The total population, as stated in an early paragraph, is estimated at 600,000 to 1,000,000 people. Only about 300 of these are foreigners, i. e., other than Chinese: British, French, American, Canadian, Japanese, Russians, and a meagre sprinkling of other nationalities. The foreign residents, however, exercise a very powerful influence, not only in religious, educational, and medical circles, where most of them nominally work, but in business, politics, and sanitation. The advice of the foreigner is sought in many ways, and his influence is felt in hundreds of places. His work serves as a model in building, living, dressing, and in social and political intercourse. His ideals point the way in nearly every avenue of life and activity.

The merchant and the student classes are almost the only self-conscious groups in any Chinese city, outside the governing class. The latter are so selfish that self-consciousness amounts to little for the good of the city. And the other two classes, who at times try to pull together and would be a power if they should coalesce, have as yet but feeble altruism and national inspiration. They still care too much about their "faces" to make statesmen of the broad type.

Much of the population is migratory. The great carrying class, whether simply coolies or donkey drivers, or boatmen, go and come. Merchants also move about much in the interest of their business. Politicians and military officials, as well as soldiers, also move in and out, some by choice, some by appointment. Even the foreign population changes notably from year to year, but it is steadily increasing. These movements of the people are characteristic of the place, because it is a commercial and political center.

Summary and Conclusions

Commercial Position. As has been shown in the preceding paragraphs, Chengtu has many points of geographic advantage. Out of these points have come its supremacy as a city in West China.

A fertile and nearly self-recuperating plain easily provides for the city's wants. The food supply and means of transporting it are good. Transportation might be improved by introducing roads and wheels and mechanical power, but the reliability would not be increased. Men would, however, be liberated for other purposes. Such a transformation could easily be wrought, for good roads, motor, steam, or electric, could be built in all directions. Motive power could be derived in large quantities from mountain streams to the west, and from the abundant coal already described. Once such roads were built, building material and fuel would become much more available, and the iron of more distant mountains might stimulate great industrial development.

Chengtu is naturally the collecting point for the business of its plain. To it come all the products that are to be shipped long distances.* Many tons of tobacco are brought by wholesale merchants and packed to go down the streams to Chungking and farther. Indigo, raised in many places on the borders of the plain and in nearby mountains, is also collected here for trans-shipment. Grains, tea, silk, and cotton textiles to be shipped farther into the mountains are gathered in Chengtu from the plains. Many cases of bean, colza, and peanut oils and of wine, bales of bristles, hides, feathers, and wool also come together here. Tubs of sugar from the plains and mountains are trans-shipped here for the West. Of course, the city's own manufactures for export are to be added to these nearby products.

Streams of Tibetan products likewise come down the valleys to the plains and to Chengtu. The city is an important herb market. Rhubarb, mints, and other leaves, stems, seeds, and roots are brought here in aromatic bundles on weary men's backs from far up in the high mountain valleys and fastnesses of Tibetan frontiers. Hides, and furs, wool and musk also come out in quantities. The greater the value that can be packed into a man's load, the more transportation charges it will stand, hence the greater the field tributary to Chengtu. For example, wood comes mainly from the plains; charcoal from the foothills and nearer mountains; but still farther back the wood must not only be charred, but burned, and only the ash brought out. From the greatest distances the potash salts alone, leached from the ashes, come down to Chengtu. Plain sandstones and granites come from local hills and nearest mountains with the coal, but marble and other ornamental stones come from more distant places; while only metals,—copper, lead, zinc and tin,—or amethyst, amber, real jade, garnets, opals, agates, and so forth, P. 372 can stand the charges of long journeys. In return for the goods brought to the city, little merchandise, aside from tea, goes far back into the mountains, but the money for the goods goes to the sources of the hides, herbs, and gems. The more fully these far penetrating valleys are opened up, and made safe for commerce, the greater will grow Chengtu's commercial supremacy, for the city is near very important gateways to far western Chinese territory.

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*It is impossible to get any figures on the amount or value of the commerce of the city. No records are kept. If Chengtu were an open port, her export and import values could be estimated, but this would not reveal her local commerce.

The products thus amassed in the capital city, are sent in bulk, generally in boats, downstream, to enter the arteries of trade. In return for them Chengtu receives from down river quantities of cotton, cotton yarn, iron and iron wares, salt, earthen ware, and foreign goods, particularly those pioneers of western civilization, the sewing machine and petroleum.

~~*Much needed Transportation Lines.*~~ Chengtu lacks communication with the northern provinces, Shensi, Shansi, and Mongolia. She can with difficulty trade with the provinces of East China on the river, but were it not for the foreign touch, this would be relatively unimportant, because the latitude and hence the products of East and West China are similar. The case is distinctly different when it comes to trade north and south, because the climate in Mongolia is profoundly different from that in Szechuan and farther south. No great physical barriers stand in the way of a grand trunk railroad north and south from Mongolia and Siberia through Chengtu and Sui Fu to the Yunnan border. And almost nothing could be a greater boon to the infant commerce of these interior states. The development of the Yangtze and of a railroad to Shanghai is strongly demanded by the expanding and avaricious trade of the western world; and the connection between Chengtu and Shanghai is important and should be maintained, but really China and especially Mongolia and the south land would be more helped by a north-south railroad.

The tropical crops of Yunnan and Szechuan might then be readily exchanged for the products of the grazing plains of the north. This north-south road would tap the mineral resources and forests of rich Yunnan, iron, salt, and coal in Szechuan, and the hay and forests of North China and Mongolia. And should this road be built to connect with the Siberian road, Chengtu would be much nearer to London and Paris than to New York. In fact, she probably could reach these European centers about as quickly as she can now reach Shanghai, and it is a month's journey from Shanghai to New York.

Again, the short east and west routes already established north and south of Chengtu could be made more valuable by a well-constructed railroad line from Yunnan to the Siberian railroad. This north-south line could easily connect with the ~~Peking~~-Kalgan line and with the Shansi line at Taiyuan Fu, and again with the line westward up the Hoang Ho, and thus three present outreaching lines of trade would be linked together. South of Chengtu the French line from the coast to Yunnan Fu could be extended to meet the north-south road. Through Shansi connections, it would also unite two of China's most populous provinces, Szechuan and Chihli.

The problems of famine would likewise be greatly simplified. Szechuan never has famines, Mongolia rarely. Both would be but two or three days' journey by rail from Chihli, Western Shantung, Shansi, Honan, and Anhui, the provinces usually worst hit by crop shortage. The connecting lines mentioned above could carry food from Szechuan to any one of these districts; or labor could migrate easily into districts not suffering from famine.

What Chengtu has in the way of through trade routes is one great river highway eastward to the coast, and several human-carrier mountain trails westward. What she needs is not only a further development of these, but a great through railroad north and south, connecting areas of diverse climate and products, as well as areas differing in density of population and stage of development.

Chengtu has been a notable city for centuries. Her geographic situation is strategic, commercially, industrially, and politically. Her work is but begun. She has centuries of great achievement ahead. Long live Chengtu, the metropolis of West China!

A PENNSYLVANIAN'S DISCOVERY OF THE DRIFTLESS AREA

LAWRENCE MARTIN

It is exactly a hundred years since the Driftless Area of the Upper Mississippi Valley was discovered by white men. The Geological Museum at the University of Pennsylvania contains a fragment of an American Indian idol,—*The Painted Stone.* It is quite as interesting, in its way, as the relics from Tutankhamen's tomb in Egypt. It was brought back from Minnesota and placed in the museum in Philadelphia ninety-nine years ago by Professor William Hypolitas Keating.

As the specimen was collected in 1823, this is the centenary of the discovery of the Driftless Area. It affords the BULLETIN OF THE GEOGRAPHICAL SOCIETY OF PHILADELPHIA an opportunity to honor a distinguished Pennsylvanian by printing the following paper.

Editorial note. A map showing Keating's route, reproduced from his book, is in Dr. George P. Merrill's "*Contributions to the History of American Geology* (Report of United States National Museum for 1904), page 275.

Col. Lawrence Martin, the author of this paper, is the geographer of the Department of State in Washington, a member of the United States Geographic Board, a lecturer in geography in the School of Foreign Service at Georgetown University, and an honorary member of the Geographical Society of Philadelphia. He was for eleven years a professor of geography at the University of Wisconsin.

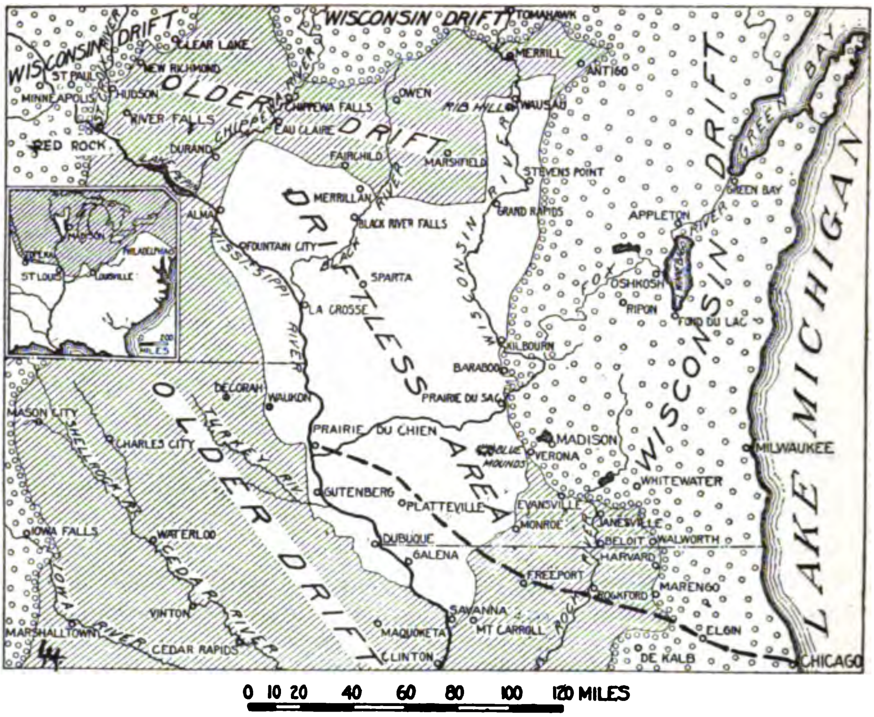
On April 19, 1916, he gave the *Heilprin Memorial Lecture* before the Society; at the same time he called attention to Keating's discovery of the Painted Stone, and, therefore, of the Driftless Area. Reference to this, however, occurs in Colonel Martin's paper in the BULLETIN for 1916, on "*The Gorge of the Upper Mississippi as a Rival of the Rhine Gorge,*" at only one point, where the printed account of the lecture refers to the idolatrous worship of the Painted Stone by the Indians.

The paper printed in the present number of the BULLETIN is largely new, but is partly based upon Colonel Martin's "*The Discovery of the Painted Stone,*" published in the *Journal of Geography*, Vol. 14, 1915, and his "*The Physical Geography of Wisconsin,*" published in Madison by the Wisconsin Geological and Natural History Survey in 1916. These two papers contain full bibliographical references. The Editor of the BULLETIN hereby acknowledges his obligation to these two publications for the paragraphs reprinted. The spellings *Wisconsan, sienite,* and *boulder* in quotations, are as in Keating's book.

A century ago Keating, a geologist from the University of Pennsylvania, travelled overland from Philadelphia to Fort Dearborn at Chicago, and Fort Crawford at Prairie du Chien, he then went up the Mississippi River. In the territory which is now southwestern Wisconsin he noted the absence of granite, syenite, gneiss, schist, and other crystalline bowlders, which we now know to have been brought by the continental ice sheet to glaciated areas. He thought of them as erratics of very old, or "primitive" rock, transported during The Flood. Keating commented upon this change in 1823, and he did so at the southern border of the district we now call the Driftless Area.

In thinking of this driftless area it should be remembered that the region is not unusual except in the absence of the features of glacial erosion and glacial deposition brought about by the continental glacier. Much of the United States is also driftless,—notably in the southern states and a large part of the West, outside the relatively small areas of glaciated mountains. These regions are not spoken of as driftless areas, or thought of as exceptional in any respect. The Driftless Area of Wisconsin, Iowa, Minnesota, and Illinois, however, is famous the world over, because it is completely surrounded by glaciated territory. It contains 15,000 square miles, being a third as large as Pennsylvania, and nearly half as large again as Belgium. It preserves a large sample of what the rest of Wisconsin, as well as northern and eastern United States, were like before the Glacial Period. Within the belts covered by the gigantic, vanished, continental ice sheets of northeastern North America and northwestern Europe there is no similar region of notable size which was left bare of glacial ice.

Keating's discovery of the Driftless Area is recorded in his book entitled *"Major Long's Second Expedition; Narrative of an Expedition to the Source of St. Peter River, Lake Winnepeek, Lake of the Woods, &c., Performed in the Year 1823, under the command of Stephen H. Long."* The book was published in Philadelphia in 1824. It is in two volumes, of 439 and 459 pages, respectively. On pages 200, 263, and 287-288 of Volume I, Keating gives his record of what he calls "the painted stone" and of the absence of glacial erratic bowlders—"the alluvial formation"—at other points along his route. The title-page refers to Keating as "Geologist and Historiographer to the Expedition," and states that the book was "com-



*Map of the Driftless Area. Keating's route of exploration is indicated by the dashed line,—from Chicago to Prairie Du Chien; north of the latter place he followed the Mississippi River. In the region near Platteville and Monroe, Keating observed about June 16, 1823, that "no granite blocks are to be seen," and that the country "becomes interspersed with hills." Two days before that he recorded that "the boulders and pebbles which, from Chicago to Fox River, had not appeared to be as numerous as in some other parts of the route, were, after we had seen the limestone in the morning, found to increase rapidly in number, though not perhaps in size. * * * from all the characters observed in the country, we hesitate not in considering its surface to be covered by an ancient alluvium, the alluvium of mountains of the Wernerian school; and in which, of course, if any lead should be found, it must be out of its original site. This alluvium consists principally of a bed of loose and uncemented pebbles, varying in size from the smallest grain to the dimensions of an apple, and interspersed with boulders, which are frequently of very large dimensions; but these do not appear to be so frequent here, whether it be because they are buried in, and concealed by the pebbles, or because they were not deposited here, we had no means of determining. The alluvium appears to consist chiefly of the detritus of primitive rocks, such as fragments of quartz, granite, sienite, &c., but as far as we could observe, without any trace of a metalliferous mineral."*

Thus Keating describes the Wisconsin Drift at and northwest of Chicago, and the Older Drift near Rock River, with bowlders increasing in number as the terminal moraine at the border of the Driftless Area was approached; thus he describes the surficial deposits which he thought of as alluvium, following the German, Werner, who believed in deposits in the waters of an universal ocean; thus we learn that Keating happened upon the evidence of the border of the Driftless Area because he was looking for the mineral, lead. Keating then goes on to record the absence of the alluvium, as quoted above on the lack of granite blocks.

The map also shows the location of Red Rock, Minnesota, where Keating visited the Painted Stone on July 2, 1823, while looking for a fallen meteorite. (Based upon Colonel Martin's map in Bulletin XXXVI, Wis. Geol. and Nat. Hist. Survey, 1916.)

piled from the notes of Major Long, Messrs. Say, Keating, and Calhoun." The book was printed subsequently in London in two editions, in 1825 and 1828, the latter with the title *"Travels in the Interior of North America."*

Before proceeding to consider what Keating observed in the Driftless Area a hundred years ago, and how he interpreted it, let us see what is known about the man himself. Keating was born at Wilmington, Delaware, on August 11, 1799, and died in London, England, on May 17, 1840. Lamb's "Biographical Dictionary of the United States" gives the main facts regarding his life.

At the time of his journey through the Driftless Area, Keating was only 24 years of age. The records of the University of Pennsylvania show that he had taken the degrees of Bachelor of Arts in 1816, Master of Arts in 1819, and was from 1822 to 1828 "professor of mineralogy and chemistry as applied to the arts." He had probably never seen glaciers, in Europe or elsewhere. His lectures and writings reveal no outstanding religious convictions as to the Biblical Flood. In the early part of the Nineteenth Century The Flood, and the universal ocean of Werner and the *Neptunists,* furnished the generally-accepted explanations of the distribution of what we now call glacial erratics and glacial drift. Keating also discovered in 1823 the field evidence of the existence of Glacial Lake Agassiz, which Lieut. G. K. Warren and Mr. Warren Upham subsequently described in detail.

Let us now see what constituted the initial Caucasian recognition and understanding of the Driftless Area phenomena, as made by Keating. He had journeyed overland from Philadelphia with Major Long's party in 1823, and entered what is now the state of Wisconsin almost exactly where the southeastern border of the Driftless Area crosses from Wisconsin into Illinois, southwest of the city of Monroe. He then crossed the Military Ridge some distance west of the Blue Mounds and went to Prairie du Chien. The party travelled northward to Fort St. Anthony at Minneapolis, Major Long and some of the other members going overland through Iowa and Minnesota on horseback; others, including Keating, travelling by boat up the Mississippi.

They observed the absence of erratic bowlders almost at once on entering the Driftless Area. They also noted when they left the bowlderless region, though not until they had passed through the

Education. Since Chengtu is the capital of the province, it is expected to maintain more of an educational system than other cities. The city contains numerous lower and higher primary schools, some open to both boys and girls, some for boys alone, and a very few for girls alone. Some of these are supported by national appropriations, some by state, and others by city taxes. In a province and city as rich as Szechuan and Chengtu, there should normally be no difficulty in providing education, but owing to political unrest, there is at present serious trouble.

Beside the lower schools, there are a dozen middle schools, corresponding in grade to our high school. None of these is co-educational. Some are aided by the national or provincial government; others are supported by the city; a few are private enterprises; and three or four are supported by residents of Chengtu who have come for commercial purposes from some other city or province, as for example, the Chekiang Middle School, and the Sui Fu and Tze Chow Middle Schools.

Normal schools, both for men and for women,—schools of about middle school grade,—train elementary teachers. Chengtu also has seven so-called colleges, all receiving government aid. Probably the best of these are the Teachers' College and the Technical College. In addition, there are the Foreign Language College, the Chinese Classics College, the Commercial, and the Law Colleges, and the College of Agriculture. All of these institutions do work of college grade, but all, with the possible exception of the Classics College, have much middle school work, and receive students with little more than higher primary training. In some instances their statistics of attendance are so confused that it is impossible to tell how many students are really of collegiate grade.

Missionary enterprise in Chengtu provides schools of all grades, from kindergarten and primary to the university; and the West China Union University is the only institution in the whole province which the government permits to grant degrees.

But when all this has been said for Chengtu education, provision has not yet been made for more than one-tenth of the boys and girls of school age. Provision for higher education is proportionally more liberal than for elementary. Further, because this city is the capital and a central city, men come to it for educational advantages from all over the province. Hence, the students in the schools do not represent the use Chengtu herself makes of her schools.

Temples and Churches. Chengtu is also well supplied with temples. Near the South Gate two beautiful shady temple enclosures are located within the city walls; as are two or three in the northern part of the city; and others in the southeast. Probably the more elaborate heathen temples, however, are outside the city walls. A very extensive Taoist temple monastery has been erected and for centuries maintained, a mile west of the southwest corner of the city. Here live scores of priests, who care for the temple and its parks and groves. North of the city, near the North Gate, a similar elaborate Buddhist temple has a retinue of servants, priests, and sub-priests in training. The people do not flock to these places as once they did. Ordinary patrons are not numerous enough to keep them up, and most of them would decline completely were it not for the occasional munificent gift of some wealthy man who has large sins for which to atone, who wishes great merit, or who simply dislikes to see the religion of his fathers decline.

The Christian church is taking its place among the people, both in organization, institutional work, and church edifices. The Catholics have a large hospital in the west part of the city, the Canadian Methodists another in the northeast, and the American Methodists a third in the south part. The latter mission has two well-equipped institutional plants with tea house, lecture halls, and other equipment. Other organizations doing intensive work are the Baptists, Friends, and Church Missionary Society. These missions, except the Catholics, are the founders and co-operating managers of the Union University. Three fine brick church buildings have been erected, and other missions hold church in adapted Chinese houses. Both the Y. M. C. A. and Y. W. C. A. have efficient organizations, and they are constantly lifting and tugging at the hundreds and thousands who deliberately walk into their influence. It is probably true that several of these mission institutions now actually reach more people than the heathen temple equipment, but it might still be doubted whether any one has as many adherents as have the Taoist or Buddhist temples.

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AN ANTARCTIC HERO—SIR ERNEST SHACKLETON

By Henry G. Bryant

Mill, Dr. Hugh Robert. The Life of Sir Ernest H. Shackleton. Little, Brown and Company, 1923.

As year by year the borders of the unknown are becoming more circumscribed, as travellers investigate the remote corners of the earth—so the men who will rank as pioneer explorers of the first order will necessarily become fewer and fewer.

None will dispute that Shackleton belonged to this select company and his admirers can congratulate themselves that the task of preparing the biography of their hero fell to the competent hands of Doctor Mill.

The author considers his subject under three headings: Equipment, Achievement, and Bafflement—redeemed from failure by heroic qualities of leadership. With characteristic British thoroughness, the reader is given an extended account of the ancestry of the explorer, which is followed by an admirable summary of Antarctic research up to the time when Shackleton entered the field.

Following an account of childhood days spent in Ireland and school days at Dulwich College in England, the reader is made acquainted with the years devoted to training in the commercial marine—a service characterized by distant voyages as a subaltern, which gave the subject of the memoir a first hand knowledge of the hazards of the sea which manifestly helped him in the rôle he was destined to play as a leader of shipwrecked mariners. Shackleton was essentially a man of action and naturally the body of the work is concerned with accounts of his achievements in the Antarctic, while on board the Discovery, the Nimrod, the Endurance, and the Quest of all of which vessels, except the first named, he was in supreme command. After perusing the successive chapters which describe the stirring events connected with these voyages, one gains an excellent idea of the engaging personality of the explorer, who appears in these pages as an unusual combination of tireless energy, dauntless courage and deeply poetic temperament. In the intervals between his southern voyages, Shackleton undertook to achieve financial independence by engaging in various business enterprises, with, it appears, uniform lack of success; but as a born leader of men, resourceful, and inspiring the unswerving loyalty of his associates, he appears in this biography as one of the heroic figures of polar discovery.

Instances abound in these pages which attest his pre-eminence as a leader; and one can search works of romantic fiction in vain for situations of peril and privation which equal the sober realities of these narratives. Note for instance, the author's description of the last lap of the return from the farthest south sledge journey in 1909:

"The finding of Joyce's depot was a precarious adventure, the worst if almost the last abstacle of their dreadful race. There were no tracks to lead to it, and it was impossible to be certain that it was there at all. During the next two days a blizzard raged, into which only starvation could drive the most valorous of travellers; but the direction was favorable. Death would overtake them if they halted and they made twenty-one miles a day in it. Even so, by the second evening they had finished their food. Then unexpectedly they struck the track of a sledge which led them to a deserted camping place where empty tins with unfamiliar labels proved that the ship must have returned to Cape Royds before Joyce's party left to lay the depot, and that the depot had been laid. * * * Next morning, early, February 23rd, Wild caught sight of the longed for depot flag, far away on the right and only raised into view above the horizon by the accident of a mirage which faded away just as Marshall had taken its bearing. But for this miraculous help, so it appeared to them, the depot certainly would have been missed; Death would have caught them, and the tragedy of Scott's party, three years later, would certainly have been anticipated."

Amid the wealth of dramatic incidents crowded into the explorer's life possibly nothing surpasses in daring the 800 mile journey made in a twenty-two foot whale-boat from Elephant Island to South Georgia, whence he brought succor to his shipwrecked companions. Referring to his management of the escape of his party after the crushing of the *Endurance* in October, 1915, our author remarks:

"If his return to the *Nimrod* on the Plateau, the Glacier, and the Barrier, seven years before, had been a race with Death on his pale horse, Shackleton's return from the *Endurance* over the Floe, the Ocean (in the whale-boat), and the Mountains, had been a long wrestling bout with the same grim adversary, dismounted, and in earnest. Never for an hour in all these months had Shackleton or his men been free from the menace which only unsleeping vigilance could save from becoming a strangle-hold. In this struggle Shackleton had risen to the height of moral greatness, though the ambition he had started with was wrecked and his party scattered."

The author is to be praised for the well-rounded portrait he has drawn of Shackleton with all his virtues and faults. For this knight-errant of exploration was a born fighter, impatient of all restraint and a law unto himself in his chosen field of effort. Coincidentally we learn that, while careful to surround himself with a competent scientific staff, "he himself had little sympathy with scientific methods, and could never understand the necessity of long preparation for scientific research in new conditions." To the student of recent polar achievements who reads of the heroic struggles of these British expeditions to reach their objectives with man-drawn or pony-drawn sledges, the wonder is that they accomplished so much. One has but to turn to the records of Peary and Amundsen to learn of the splendid marches made in comparative ease with dog sledges by these explorers, as contrasted with the laborious advances of their British colleagues, dependent in their method of traction, as they were on the human animal. This devotion to the traditions of Admiral McClintock of the Franklin Search days, doubtless detracted from the efficiency of Shackleton's and other British expeditions, and may indeed lay them open to the charge of lack of adaptability. For, witness the following observation by so sound a polar authority as Doctor Mill as illustrating the conservative British mental attitude on this subject: Referring to Shackleton's assignment by Captain Scott to break in the dogs on the Discovery expedition, our author remarks: "The result was better than one could have expected; but it served to strengthen the fine old British tradition which Sir Clements Markham set such store by, that the best polar draught animals are the human members of the expedition. And in their hearts the *Discovery* people did not believe in dogs."

The format of the book leaves nothing to be desired. The illustrations and index are adequate and the whole forms a fitting testimonial of one of the outstanding figures of modern exploration and adventure.

BOOK REVIEWS

Pack, Arthur Newton, Associate Editor Nature Magazine. *Our Vanishing Forests.* MacMillan, New York, 1923. 189 pages.

The foreword by Col. William B. Greeley, Chief Forester of the United States, emphasizes the importance of the forest and the necessity for making every citizen a "forest-wise American," with an intelligent knowledge of the growth and use of the forest.

With this object in view, the author has written a comprehensive and readable book which contains many practical suggestions and information regarding protection from fire, clearing land of timber, planting trees, etc., never losing an opportunity of impressing upon the reader the startling fact of the waste and carelessness heretofore shown in regard to our forests. At one time they were considered inexhaustible, but by accurate computation it is estimated that such tremendous inroads have been made upon our supply that it will require years of careful attention to this problem to re-forest acres of waste land, and to make them productive for future generations.

Education is the key-note of forest preservation, and children should early be taught the value of the forest and how to preserve it, as the annual consumption of wood for all purposes is fearful to contemplate. Only a systematic and conscientious handling of the serious situation which confronts us, undertaken by the Government, and with the hearty co-operation of the people can overcome the reckless depletion of our vanishing forests.

L. B.

Williams, M. B. *Through the Heart of the Rockies and Selkirks.* Canada's National Parks. Department of the Interior, Ottawa, 1921. 100 pages, with many photographic illustrations, index and three maps.

This little guidebook admirably describes the four parks of the Central Rockies and Selkirks along the line of the Canadian Pacific Railroad, covering and extending material contained in the *Guide to the Lake Louise District,* by W. D. Wilcox, and *The Selkirk Mountains,* by A. O. Wheeler and E. Parker.

The information is intended chiefly for tourists travelling along the railroad or contemplating a first tour. Well-illustrated chapters deal with The Canadian Rockies; Rocky Mountains Park; Walks, Drives, Climbs and Trails about Banff; the Lake Louise District; Yoho Park; Glacier Park; and Mt. Revelstoke Park. Useful appendices describe the Vegetation and Wild Life, outline various Trail Trips, and tabulate Place Names and Altitudes.

There are a few errors which might have been obviated by more careful investigation. Altitudes have not been corrected to the Interprovincial Boundary Survey figures, available before the book was published; the Ten Peaks (p. 50) are no longer known by the Indian numerical names; the great Freshfield group (p. 54) includes not a single one of the "giants" mentioned, nor does the Columbia icefield cover nearly 200 square miles. Two of the illustrations (p. 39 and 54) were taken outside of park limits, while the sketch maps at the end of the book are far below the usual standard of the Department of the Interior.

J. M. T.

GEOGRAPHIC NEWS AND NOTES

The Wrangel Island Relief Expedition, which left Nome August 3 to relieve a party led by Alan Crawford, which went to Wrangel Island in 1921, has returned with the news that all of the party except one had perished.

Harold Noice, leader of the relief expedition, reported that he found little ice and had no trouble in reaching the island in the power schooner Donaldson. The one person left alive from the Crawford expedition was an Eskimo woman.

Three Americans and one Canadian were at the head of the Crawford Expedition, which sailed for Wrangel Island on October 9, 1921. Members of the party, all of whom were young men, were:

Allan Crawford, son of Professor Crawford, of Toronto University, leader of the expedition; Frederick Maurer, of Akron, O.; E. L. Knight, of McMinnville, Ore., and Milton Galle, of New Braunfels, Tex. There were four Eskimos with the expedition.

The party made the fifth expedition started by Vilhjalmur Stefansoon, one object of the expedition being to claim Wrangel Island for Great Britain by right of colonization. Crawford, as a Canadian, raised the British flag upon landing, and officially claimed the island. In fact it was largely because of his nationality that he was put in command of the expedition. He was barely twenty-one years old, and it was understood he would be guided by Knight and Maurer, who had had considerable experience in polar expedition.

Wrangel Island, north of Siberia, is about 500 miles west of Point Barrow, northernmost tip of Alaska. The men expected to stay in the far North for two or three years, mapping the undefined northern boundaries of the island and gathering other scientific data.

Stefansson received word on September 27, 1921, that the party had arrived safely on the island, and was well prepared to meet the coming winter.

We learn from *Science* that a line of soundings across the Pacific Ocean from San Francisco to Australia, taken at intervals of about five miles by the sonic depth finder, was run this summer by the new scout cruiser *Milwaukee*, "shaking down" cruise. The itinerary of the cruise was prepared by the Navy Department, and included a visit to Melbourne or Sydney.

The Pan-Pacific Science Congress met in Melbourne from August 13 to 22, and in Sydney from August 23 to September 6. It was intended to have the results of this unique survey of the Pacific ready for presentation at the congress, following the *Milwaukee's* voyage.

Other new vessels of the navy are being equipped with the sonic depth finder and when sent out on their trial cruises will make soundings in many widely separated parts of the sea. Older vessels will be so equipped when undergoing repairs or overhauling.

Many new soundings are now being made by naval vessels equipped with the new sounding apparatus, which measures the depth by measurement of the time necessary for a sound wave to travel to the bottom and back again. Soundings may be taken while travelling at full speed. The Hydrographic office is busy recording the results of these new surveys which agree quite closely with older soundings made by line, but which owing to the rapidity with which they may be taken, are opening up many partly charted and little known regions of the sea.

Twenty-five eggs of herbivorous dinosaurs preserved eight or ten million years ago in various stages of incubation are prizes among a thousand prehistoric fossil specimens gathered by the *Third Asiatic Expedition of the American Museum of Natural History*, the members of which have returned to Peking from the Mongolian desert.

Scientists never before have been certain that these goblin-like prehistoric reptiles laid eggs. These are the first discovered, according to Henry Fairfield Osborne, who returned with the expedition after a trip through the fossil fields.

They are curious-looking, brick-colored, elongated petrifications six inches long, one or two of which, broken, show the formation of embryo dinosaurs.

Another feature of this most successful trip, according to Dr. Osborne, was the discovery of many specimens of upland terrestrial types of reptilian life.

The expedition had three objects. The first was the successful demonstration beyond doubt that Mongolia was the dispersal center for animal life which came to America via the Behring land bridge.

The second object was the finding of the most primitive forms of present-day animals; in this the expedition was less successful. It failed to find the expected five-toed horse, but the scientists believe they will yet do so.

The third object was the throwing of light on the remote ancestry of man. This also was unsuccessful, but the expedition is hopeful of later finding traces of the earliest manlike animals in Asia.

This expedition gathered nine tons of fossils, including 500 valuable specimens, which Dr. Osborne declares is a world record. In the collection are seventy-two skulls and ten complete skeletons of dinosaurs. The titanotheres found are exact brothers of those discovered in the North of Utah, Montana and the Balkans, and must have originated in Asia, after which they wandered to America and Europe.

The expedition was made up of eight Americans with five motorcars and seventy camels, which covered the 3000-mile desert circuit without a serious mishap and returned safe. The farthest point, a thousand miles west of the Kalgan base, was reached after five days of motoring through a frightful gravel desert. The food almost gave out while awaiting the caravan. Meat was eaten almost exclusively, the five days' flour ration being reserved by unanimous consent for pasting fossils. Finally sixteen camels brought up relief, the rest giving out while en route on account of the entire lack of grazing, but later all recovered.

Roy Chapman Andrews says the American cars proved motors usable for Mongolian transportation. Four of the cars were sold for a good price after two desert expeditions.

Dr. Osborne, who is highly enthusiastic, says the present expedition will continue two more years and then he will attempt to extend the work.

Next year the expedition will endeavor to fill in the chapters of the prehistoric story told by the fossils already found.

Reconstruction of Asiatic life in dinosaur times 10,000,000 years ago, can be accomplished through the discoveries in Mongolia of the expedition of the American Museum of Natural History. Curator William Diller Mathews of the museum said:

"This is the biggest paleological discovery in history. It doubles our knowledge. Previously there were but forty or fifty prepared skulls in existence. The expedition has evidently unearthed a vast new mass of data which will enable scientists to establish whether the dinosaur is the ancestor, eons removed, of the modern quadruped."

The following despatch from *Captain Donald B. MacMillan,* dated September 24, was received in Prince Rupert, B. C. It indicates that the schooner 'Bowdoin' is in winter quarters, ten miles north of Etah, Greenland, in Latitude 78.30 north, Longitude 72.30 west:

"Ice formed yesterday around the 'Bowdoin' and we are now completely frozen in for the probable duration of ten months. During the last few days Smith Sound has been covered with young ice and the thermometer is down to nine above zero.

"The sun is very low at noon. We have one month more before it leaves us entirely and the long Arctic night begins. The sun will not return until the 19th of next February, a period of 118 days.

"We have killed a number of seals, Arctic hare, walrus and ptarmigan and are, thus far, well supplied with meat.

"Our Eskimos are now preparing to hunt polar bear and reindeer during the twilight of fall. Although troubled at first with considerable static in our radio reception, the concerts and voices are becoming each day more distinct. New antennae are being erected, reaching from the mast of the 'Bowdoin' to the cliffs, and should give better results.

"We have heard several hundred amateur stations, some as far away as Los Angeles, Mexico and the Hawaiian Islands. The Eskimos are very much interested in hearing voices from America and do not understand how it can be possible. We ourselves sometimes feel it a trifle uncanny to hear familiar voices and music suddenly sounding out of the deep, white silence of the Arctic night."

Charles Kruger, last survivor of the *Polaris Expedition* that sailed from Brooklyn in 1871 in search of the North Pole, died, September 11, at his home in Brooklyn. He was seventy-seven years old. For many years after his return from the North he piloted ferryboats on the 34th St. ferry.

The Polaris party reached a latitude of 82 degrees, the furtherest north of that time. The ship was wrecked and the men were rescued from an ice floe after great suffering.

The discovery of the *Grave of a Member of the Ruling Family of the Feudal State of Cheng,* is described by Carl Bishop, of the Freer Gallery, as the greatest archeological find ever made in China. The discovery was made at Hscinchengsien, Honon, by a man digging a well.

The valuable objects include a hundred pieces of bronze, some of which are gold covered and inlaid with precious stones.

Many of the objects were broken, owing to the awkwardness of the soldiers, but their worth, besides their untold scientific value, Mr. Bishop estimates at $250,000. The skeleton, nearly 3000 years old, impregnated with vermillion and well preserved, was found twenty feet deep. Several passages led to the center of the mound where the treasures surrounded the skeleton.

General Wu Pei Fu has asked Mr. Bishop to co-operate in opening other mounds believed to contain members of the same family.

The bronzes, which are of the Chow dynasty, include a war chariot with four large bells, one weighing 200 pounds; a wine pot given to the royal family, two large vases, small jades, pearls and beads.

The treasures will be placed in a museum at Peking.

Lauge Koch, the Danish explorer, who started in March, 1921, on an expedition to Greenland, expected to arrive home on September 26, having succeeded in completing the task of charting far north Greenland, which he commenced on the second Thule expedition in 1917.—*Science.*

An expedition sent out by the *National Geographic Society,* which has been assembling its personnel and equipment at Gallup, New Mexico, started on September 17 for a reconnaissance of the San Juan country of southeastern Utah, hitherto unexplored.

Leaving Gallup the party used automobiles, carrying its supply of gasoline in drums to Kayenta, Arizona, and then planned to travel on horseback across the Utah line into a land of knife-edge canyons, bold buttes and green-topped mesas until the pack animals encountered impassable barriers. Then it will proceed on foot.

The expedition will attempt a preliminary survey of the region between the Colorado and San Juan rivers, much of it never traversed by white men, which constitutes one of the largest unexplored areas in the country. The area of observation lies within San Juan County, a county which is larger than the State of New Jersey.

Dr. Neil M. Judd, archeologist, of Washington, leader of the National Geographic Society expeditions which excavated and studied the pre-Columbian communal dwellings of Chaco Canyon, New Mexico, heads the Utah expedition. Accompanying Dr. Judd is Edwin L. Wisherd, a staff photographer of the society, and a party of assistants and guides.

Dr. Judd's primary attention, on his reconnaissance, will be to determine whether the cliff dwellings and skeletal remains, the traces of pottery, basketry and cliff inscriptions believed to abound will justify other larger expeditions of the society which shall include experts in every phase of scientific inquiry which the area warrants.—*Science.*

ACTIVITIES OF THE SOCIETY

The preliminary program of winter meetings has been arranged as follows:

Nov. 7—Dr. J. Monroe Thorington, F.R.G.S.
"Mountaineering in the Canadian Icefields."
Nov. 21—Major E. Alexander Powell
"By Camel and Car to the Peacock Throne."
Dec. 5—Mr. Herbert W. Gleason
"The Lafayette National Park, Mt. Desert, Maine."
1924
Jan. 2—To be announced.
Jan. 18—Mr. Branson DeCou
"Dream Pictures of America's Wonderlands."
Feb. 6—Miss Rosita Forbes
"The Secret of the Sahara."

MOUNTAINEERING IN THE CANADIAN ICEFIELDS

Dr. J. Monroe Thorington, F.R.G.S.

Two Expeditions, undertaken during 1922 and 1923 for the purpose of exploring the vast area of peaks and icefields at the sources of the North Saskatchewan River, were described to the Society on Wednesday, November the seventh.

The region, on the Continental Divide, in Latitude 53, is approximately seventy-five miles north of Lake Louise and the Canadian Pacific Railroad, betwen Howse and Athabaska Passes. By way of these valleys passed the first trans-Canadian routes through the mountain barrier to be followed by men of the Hudson's Bay and North-west Companies.

In 1922, the Freshfield Group was visited, where studies of glacial motion were carried out, the climbing party securing first ascents including that of Mt. Barnard, 10,955 feet, the highest summit of the group.

The Columbia icefield, the largest in the Rocky Mountains of Canada, was explored in 1923. The icefield is the greatest watershed in the world, giving rise to headwaters of the Saskatchewan, Athabaska and Columbia rivers, flowing to three different oceans. The first complete crossing of this field was made, the climbs culminating in the first ascents of Mt. Saskatchewan, 10,964 feet, and North Twin 12,085 feet, the latter being the third elevation of the range and the highest peak entirely in Alberta. The second ascent of Mt. Columbia, 12,294 feet, was made and a new route for horses discovered to the Wilcox Pass area by way of the Saskatchewan Glacier.

(Accounts of these Expeditions will be found in the Bulletin, October, 1922, in the *Alpine Journal*, November, 1922 and 1923, and in the *Canadian Alpine Journal*, 1923.)

Mr. Alfred M. Collins, one of the Councillors of *The Geographical Society of Philadelphia,* sails for Africa on November 15th, on an extensive journey, which will combine big game shooting with scientific collecting. Mr. Collins will be accompanied by Mr. T. Alexander Barnes, the well known African traveller, and will land on the east coast at Dar-es-salaam, proceeding thence to Lake Tanganyika and eventually reaching the Lake Kivu region of the Belgian East Congo.

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